

COMMUNICATION OF
AGRICULTURAL RESEARCH FINDINGS
TO THE END-USERS
AND UTILISATION BY THEM

By
N.H. ATTHREYA
Assisted by
(Miss)R. SEETHALAKSHMI

INDIAN INSTITUTE OF PUBLIC ADMINISTRATION
NEW DELHI-1.

COMMUNICATION OF AGRICULTURAL RESEARCH FINDINGS
TO THE END USERS AND UTILISATION BY THEM.

C O N T E N T S

<u>Chapters</u>	<u>Title</u>	<u>Page No.</u>
	20 years of Progress in Agriculture: Some facts and figures	(i)
	Introduction	(ii)
	Summary of Recommendations	(v)
I	The need and the possibilities	1
II	Scope and Place of Agricultural Research	4
III	Planning Agricultural Research	10
IV	Research Administration and Performance	15
V	Funds for Research	18
VI	The Common goals	22
VII	Users of Research	25
VIII	Users of Research and Communicating to them - The Extension Scientist	26
IX	Users of Research and communicating to them - The farmer	30
X	Users of Research and Communicating to them - The Consumer Public	41
XI	Users of Research and Communicating to them - General Public	44
XII	Diffusion and Adoption	46
XIII	Supports for Adoption: Credit	64

<u>Chapters</u>	<u>Title</u>	<u>Page No.</u>
XIV	Supports for Adoption: Inputs	73
XV	Time as a Critical Factor in Adoption	83
	Conclusion	91

Appendices

I	Technological Improvement and dissemination in Taiwan	93
II	Estimates of Production of Selected Commodities at the end of the Fourth Plan	94
III	Questionnaire issued to agricultural research organisations and a sample of the reply received.	95
IV	A note on 'Programmed Instruction'	98
V	List of films on Agriculture	99
VI	Extracts from various reports on Agriculture	100
<u>VII</u>	<i>A Note on Coop Insurance</i>	<i>135</i>

20 Years of Progress: Some Facts and Figures: AGRICULTURE

The average agricultural growth rate has increased to 3.9 per cent from the stagnant $\frac{1}{2}$ per cent prior to 1950.

A rise in food production by 61.8 per cent - from 542 lakh tonnes in 1950-51 to 890 lakh tonnes by 1964-65. Because of extensive drought, production fell to 723 lakh tonnes in 1965-66, but picked up the following year to touch 759 lakh tonnes.

Rice production is up by 170 lakh tonnes, wheat by 55 lakh tonnes, jowar by 35 lakh tonnes, bajra by 18 lakh tonnes and maize by 23 lakh tonnes.

The yield per acre of food grains has increased from 1,219 lbs. in 1949-50 to 1,669 lbs. in 1964-65 - a 37 per cent increase.

Cash crop production has risen by 74.9 per cent - 64.9 per cent in oilseeds, 106.5 per cent in fibres, 50.3 per cent in plantation crops and 77.9 per cent in miscellaneous crops.

The total area cultivated has advanced by 24.6 per cent, with a 27.1 per cent increase in yield per acre and a 58.4 per cent increase in production.

The irrigated area has increased by 2.8 crore acres to 8.2 crore acres.

The area under improved seed has risen from virtually nil to 12 crore acres.

Fertilizer consumption has gone up seventeen fold from 56,000 tonnes to 9.5 lakh tones of nutrient elements.

Twenty per cent of all investments in the national economy has been placed into agriculture-linked projects - 7 per cent into irrigation works alone.

Source: Times of India,
Independence Day Supplement.

INTRODUCTION

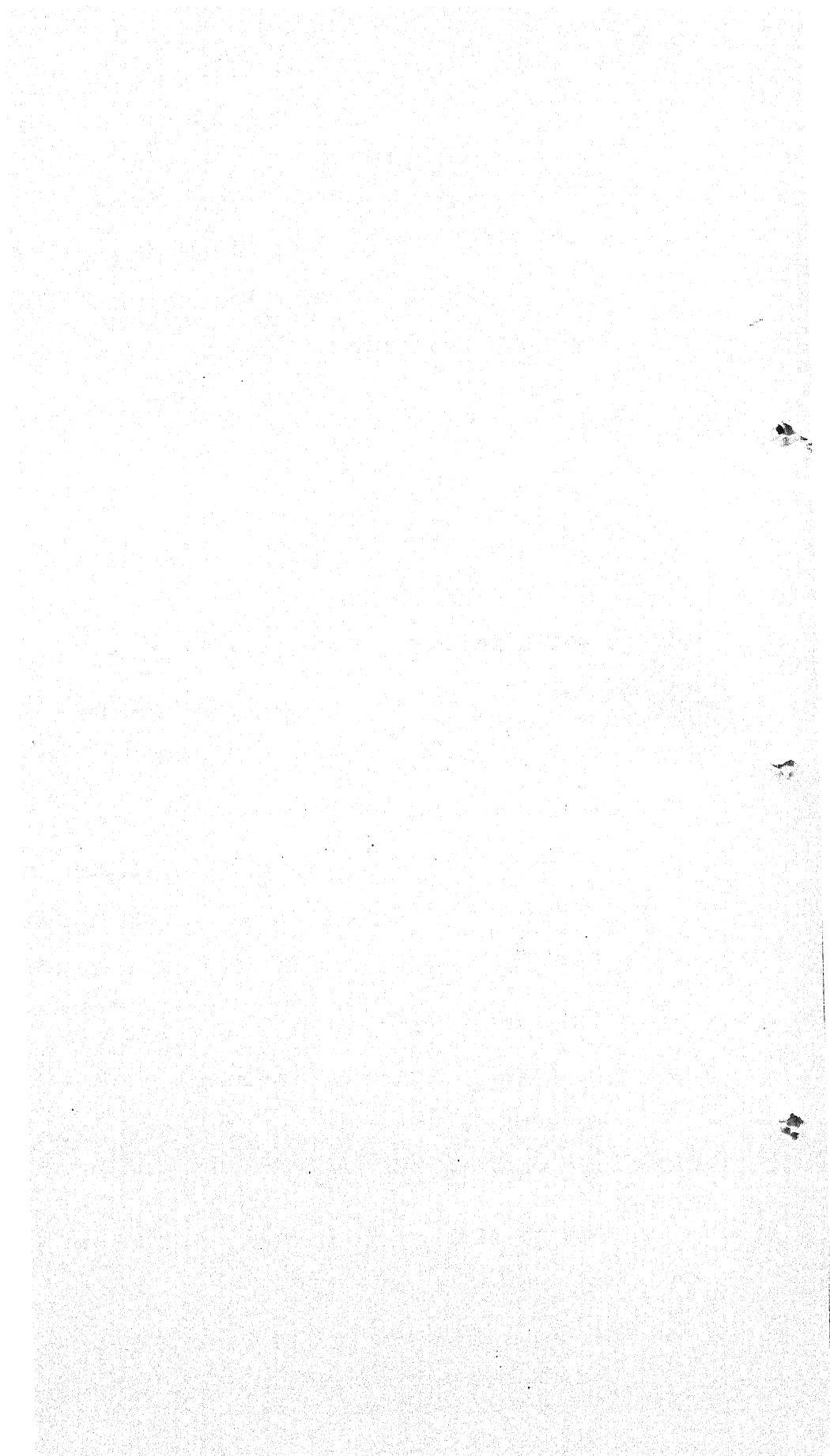
The fairly bright picture on the opposite page has been made possible by the combined effort of the research scientists, the extension scientists, the legislative and administrative leaders, the field force and the farmers. The hope is that this picture can be still better if the utilisation of research findings is still better. The AIM of this study then is to examine how agricultural research findings are communicated to the ultimate user, the farmer and how well the latter utilises them and, as a result to identify problem and opportunity areas.

This particular study arose out of the fact that we made a similar 'technology transfer' or 'utilisation' study in respect of industrial research done at the various national scientific research laboratories.

The variables here in the agricultural field are different and much more complex. What is common, however, is the process of technological transfer and all that it implies.

Due to limitation of time, we adopted the following approach:

We studied in detail a few chosen successful utilisation projects. They are (1) Hybrid maize (2) Mexican Wheat (3) Taichung Native I (4) Tainan 3.



We also examined two samples of National demonstration programmes.

We further studied a farm community in an IADP* District, Viz., Maddur in Mandya District (Mysore State).

We interviewed farmers from three states - Gujarat, Maharashtra and Mysore - half a dozen from each State.

Through a questionnaire we collected data from the agricultural research laboratories attached to ICAR.

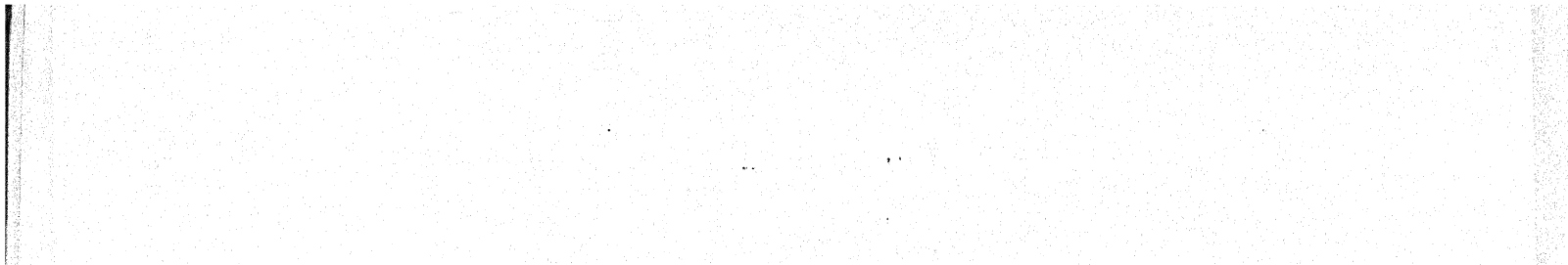
As a result, we developed a tentative hypothesis** which we discussed with scores of knowledgeable people - agricultural research scientists, science-administrators, extension scientists, state agricultural officers, IADP officials, representatives of foreign organisations assisting us in agricultural research and extension programmes and representatives of farm organisations.

The resultant of the delivery-end study is this report. Based as it is on limited data and observation, it is an indicative report spotting problems and highlighting opportunities. It is not a descriptive, statistical or evaluation report.

The scope of this study is limited. It covers only a part, though a vital part, of the total picture of agricultural production.

* Intensive Agricultural Development Programme.

** ~~Please see appendix I.~~



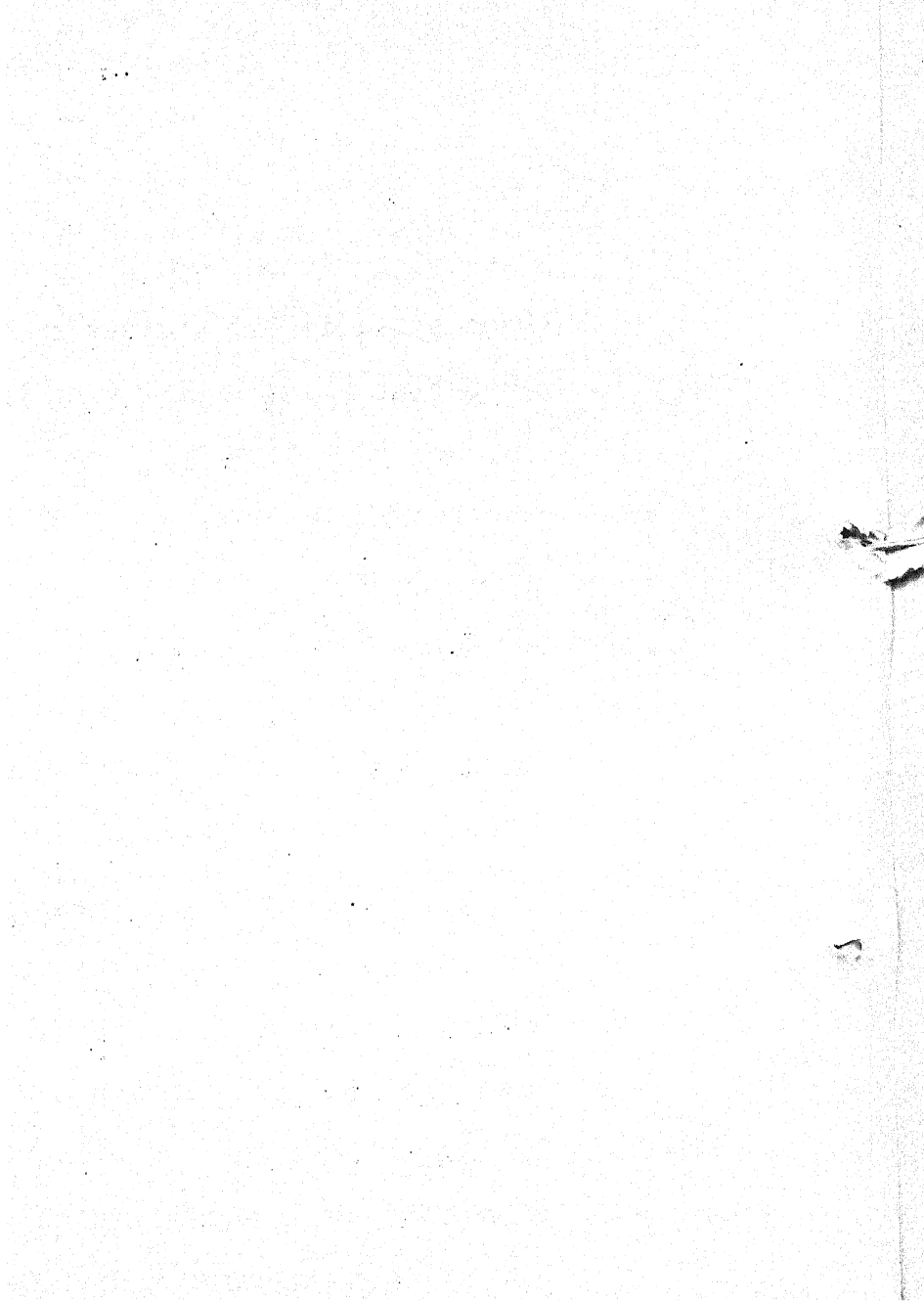
The total picture of the problems of agriculture has been periodically and systematically looked at by competent teams with a view to recommend steps to improve that total picture. We thought it will help the reader to have, ready at hand, a summary of the findings and recommendations relevant to this particular study made in these reports. This we provide in Appendix II. Though specific information was not available, we learn many of these recommendations have been well taken and given effect to.

Much has been done and more is being planned to achieve the mission in the agricultural sector and our report will therefore underscore such major practices (a) as help the ultimate mission and therefore deserve strengthening (b) as seem to hinder the ultimate mission and therefore deserve review and (c) as are likely to help the ultimate mission and therefore should be introduced and given a fair trial.

We wish to take this opportunity to thank all those who gave generously of their time and share their insights and experiences; and in particular the members of the Advisory Panel - Dr. M.S. Swaminathan, Mr.K.P.A. Menon, Dr. W.B. Donde, Mr. D.V. Reddy and Professor N. Srinivasan - as also Mr. B. Sivaraman, who evinced great interest in this study.

N.H. ATTHREYA

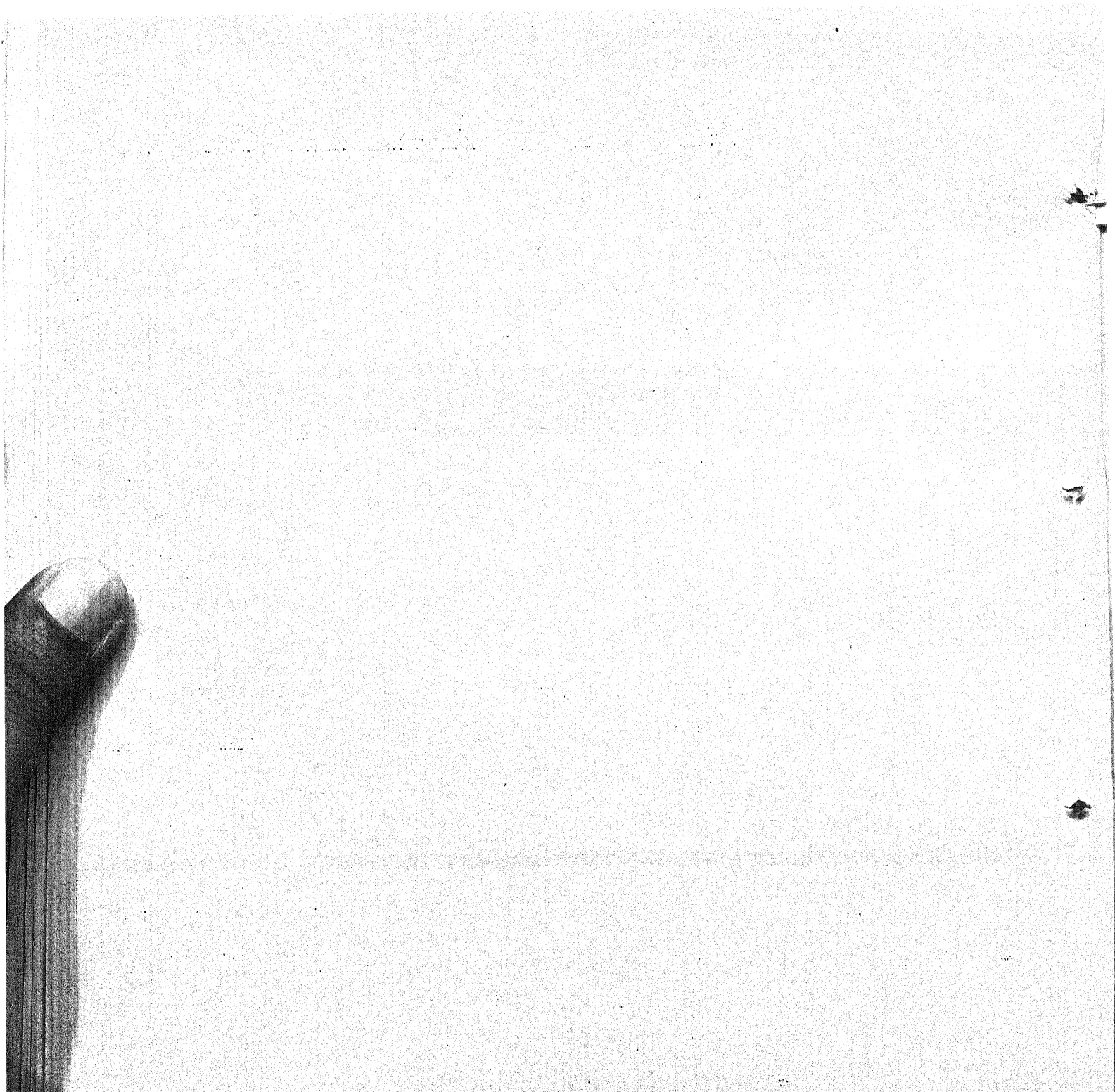
24th August, 1967.



✓ A SUMMARY OF PRINCIPAL CONCLUSIONS AND RECOMMENDATIONS

1. Since utilisation of research findings is not a stray phenomenon but a part of a totality and since every aspect of that totality tends to affect this utilisation aspect, it is recommended that every aspect relating to utilisation of research results is noted and strengthened. Since in the final analysis it is the farmer who utilises and converts research findings into production results, and since the results he obtains are of national importance, and since he is a willing user of research finding, it is further recommended that the approaches taken by the research, extension and administration agencies be as much farmer-oriented, as goal-oriented.
2. Since the results depend upon timely action and timely action on the part of the farmer depends upon the official and non-official agencies in good measure, it is recommended that timeliness is given over-riding importance in the scheme of things.
3. Since physical and psychological distances tend to dilute the sense of urgency and /
a distorted view and reality, it is recommended that special efforts should be made by research

✓ encourage



scientists, extension scientists and administrators to be in live touch with the delivery-end through periodic visits.

4. Since our resources of trained men, material and money are limited, it is recommended that there is a national blueprint for agricultural research and that this blueprint provides, proportionate ~~to the~~ needs, for pioneering and break through research, applied and adaptive research and research for tomorrow and research for days of plenty.
5. Since there is a fair amount of illiteracy among the farm population, since the farmers seem to be taking to new methods eagerly, and since the know-how should be reached to large numbers effectively and fast, and since we have the facilities to make good documentary films , it is recommended that plan be used as the major tool of diffusing new knowledge.
6. Since there are established and accepted outlets for written communication in the form of dailies, general periodicals and farm periodicals and since they cater to their readers with skill, it is recommended that we support and work through existing agencies and not duplicate them by too many official publications.

7. While other methods of extension work, the most effective one seems to be the demonstration-on-the-farm method. Still more effective is the 'show-how' by a fellow-farmer without personal guidance from the extension scientists. It is recommended that the leading and innovating farmers are spotted and given special support so that they can give their active hand in the extension work. Also, since such farmers are approached by the brother farmers for advice and guidance, it is further recommended that these farmers are made in effect local farm advisors so that they may play the 'general practitioners' to the community and have access to the specialists in the department and the university and also serve as a 'multiplier.'
8. Since a single agency may occasionally fail to deliver the materials and services in time to the farmer, and since such a failure could mean failure to use the modern methods and get results for the season, and since such a failure may keep him away from modern methods, it is recommended that the farmer has access to alternative agencies for assistance regarding inputs.
9. Since serving the farmer is more important than replacing the middleman, since we have a fair section of non-official agencies that are serving



the farmer well, it is recommended that the focus be put on stepping up the service quality of official agencies and not stopping any that compete in giving the needed service to the farmer.

10. Since the mission is more important than the means, and since we have dependable and non-profiteering distribution outlets, it is recommended that the farmer be allowed choices in respect of suppliers, services and credit.
11. Since the infrastructures like irrigation are inadequate, and since developing the land for modern cultivation is a cash-consuming operation, it is recommended that credit facilities be made available to him over and above what exists and preferably through commercial bank and through the proposed Agricultural Finance Corporation. Since atleast the larger cultivators may be prepared to make the needed sacrifices, it is further recommended that for credit purposes the land and the major agricultural equipment like tractor be treated like tangible assets as is done in urban industrial sectors and overdraft facilities provided.
12. Since either because of inadequate support or lack of timely support or some other reason, it is likely that the farmer fails in the new method which he at times initiates at the instance



of the government, and since such a failure a large section of India's farm population cannot afford, it is recommended that the average production is underwritten through crop insurance or otherwise and that such an expenditure be treated as a legitimate cost of agricultural innovation.

13. Just as a provision should be made for the dark day, provision should be made for the bright day also. Arising out of greater agricultural production, it is possible that the prices fall and the farmer's net income becomes lower. If and when that situation arises, the farmer will have no motivation to maintain his high production. It is therefore recommended that he be given price support as is done in other countries like Japan.
14. Since little moves in this country without a piece of paper authorising such movement, and since the paper-movers have the choices of playing the facilitating or long-distance controlling function, it is recommended that necessary adjustments are made to reduce administrative delays within the existing setup.

15. Since it has been repeatedly pointed out that the inherited administrative and financial rules and procedures are based on checks and counter checks, useful only for colonial control purposes and NOT for accelerated developmental purposes, and since it is further pointed out that action towards amending these rules and procedures can be taken up only at the highest level, it is recommended that the Cabinet gives attention to this problem on a priority basis.

I

The Need and the Possibilities

1. The Third Five Year Plan states:

"In the schemes of development, the first priority necessarily belongs to agriculture; and agricultural production has to be increased to the highest levels feasible."

2. The Planning Commission in the draft outline of the Fourth Plan has stated "If top priority for agriculture in the Fourth Plan is to be really meaningful and effective, it is not only necessary to bring together the various targets and programmes in the agricultural sector but also to identify and give preference to those activities in other sections which bear on the implementation of the agricultural plan. The Fourth Plan seeks to ensure in the first instance that provision of material inputs and other supporting services which condition and stimulate agricultural growth should receive top priority. In Industry for examples, the production of fertilisers, pesticides, tractors and agricultural machinery will be the first charge on the nation's resources. In power, rural electrification programmes which evergise tube-wells and pumps for irrigation purpose will get precedence. Similarly in transportation, education and research, programmes which have their impact

on agricultural development will receive greater attention."

3. Experience in countries like Taiwan, Mexico, Israel, Japan and United States of America and particularly Taiwan* indicates that agricultural research and extension play a key role in meeting the objective of greater agricultural production and productivity.
4. In another sphere, namely public health, we have indeed achieved much in the past two decades. The average life expectancy in 1947 was 28. To-day it is 45, thanks to the efforts taken by the Government, the medical practitioners and the pharmaceutical industry. The point is that similar performance is indeed possible in Agriculture.
5. In fact in two areas of agricultural production - grapes and sugar cane - we have established and are maintaining world records. A few years back, a production 2000 to 3000 Kgs of grapes per acre on the average was considered satisfactory yield. Thanks to the devoted work of a few and the changed outlook of cultivators, we produce to-day on an average 15000 kgs. per acre. Some producers have touched even the 25000 kgs. mark. Also in sugar

* Please see appendix.

cane, almost in a decade, we have raised our average production per acre from 50 to 152 tons, again ~~held~~ highest in the world.

6. It should be possible to extend this performance to production of food grains (f) with the ~~help~~ of agricultural research and utilisation of the research findings.

II

SCOPE AND PLACE OF AGRICULTURAL RESEARCH.

1. Increased agricultural production comes from new techniques or methods put into practice on farms. It is simply not possible to get much increase by using the same old plant and animal materials and the same old soil in the same old ways. It calls for new technology of farming.
2. The "technology" of farming means "the way it is done". It includes the methods by which farmers sow, cultivate, and harvest crops and care for the livestock. It includes the seeds, the fertilizers, the pesticides, the medicines and the feeds they use, the tools, the implements and the sources of power. It includes enterprise combinations by which farmers seek to make the best use of their labour and land.
3. For agricultural development to proceed, these must constantly be changing. When they stop changing agriculture becomes stagnant. Production stops increasing and it may even decline due to decreasing soil fertility ~~or to increasing damage by~~ multiplying pests and diseases.
4. Just as the best methods now used by the best farmers in a region are not good enough for tomorrow,

so the best technology that can be introduced from some other part of the world is not sufficient to assure a constantly improving agriculture. WE MUST CONTINUALLY BE DEVELOPING REALLY NOVEL FARM TECHNOLOGY IN ORDER TO KEEP AGRICULTURE MOVING AHEAD.

5. Agricultural Research is careful and diligent search for better and still better farm technology.
6. To emphasise the function, three classifications of research are normally mentioned: fundamental, adaptive, and experimental. The latter two are also referred to as 'applied' while the first one as 'basic'.
7. Fundamental research is important for our country. Tropical agriculture has been the subject of much less intensive study than sub-tropical and temperate agriculture.
8. We should assign such important research to a few selected centres and support them in a big way - we should staff them well, give them the needed facilities and funds, understand the nature of pioneering research, and let the men have the freedom to use their imagination and risk funds to tackle tough problems farmers are facing.

9. At the majority of research centres in the country, the projects should be use-oriented or applied and relate to the felt needs of the farmer. Indeed, it is said to be the case now. Even the agricultural universities are taking, in large part, problems faced by the agricultural community around.
10. Till recently, however, in many agricultural research laboratories and certainly in the academic centres, only the break-through research was considered research, with the result that agricultural science students felt they had done a commendable job once they had produced and published a paper, mostly based on laboratory experiments, whether the problem they chose had any relevance to this country or no.
11. If the break-through research has its attractions, the need-based, use-oriented research has its compensations, research scientists have come to realise. Such research benefits the researcher in that he gains confidence in his methodology and capacity. It puts him in direct touch with the would-be user of his research findings and thereby gives him an appreciation of reality. Since he sees the totality, he perceives the size of the research project he has undertaken and

this gives him the humility he needs to be an effective research scientist. Indirectly, he tends to share his systematic approach to things with the farmer. And finally, it gives him the professional satisfaction that a problem has been solved, benefiting some of his countrymen.

12. A part of our fundamental and adaptive research should be consciously directed to tomorrow. If the present trend continues, we may even grow more than our national need. Atleast in the rice area, we are likely to be a major exporter. These good days should be visualised even to-day and provided for by systematic research. Increasingly, then, research should give attention to post-production problems - problems of storing, processing exporting and the like. Though the current emphasis is on production, it will not be long before the goals for research are:-
1. To reduce costs of production.
 2. To widen markets and reduce wastes in distribution.
 3. To discover new uses for farm products and byproducts.
 4. To adjust production to demand.
 5. To improve the quality of farm production.

13. If utilisation is a primary goal of research, it will be well to emphasise the scientific and systematic method. What one works on does not make one a scientist as much as the method with which he works on it. In that sense one who scientifically and systematically takes a research finding to the farmer and fits it into the overall context is also a scientist. One who works in the laboratory may be described a research scientist and one who does the extension may be described an extension scientist, to emphasise the function. Both play the role of a scientist, only at different links of a chain. We emphasise this nomenclature because its absence atleast partly accounts for the psychological distance that exists to some degree between the two classes of scientists today.
14. By the same token one who has ceased to adopt the scientific method in his work cannot be described a scientist though he held the job title of a scientist at one time in his career. The point of mentioning this aspect here is that some ex-scientists overrule working scientists without even listening to them on the logic that they were one time working scientists in the same or some other discipline ignoring that their knowledge

may be outdated. Result? The cause of science suffers; the morale of the working scientists suffers.

15. One practice that has kept up the scientific temper and role perceptions in some of the countries is the inter-movement of scientists. Thus, if agricultural research scientists can play the role of extension scientists and, may be, even the job of the administrator for a limited period, and come back to their original choice, they will be able to discharge their function with more understanding; the scientific temper is likely to prevail in other functions too.

III. PLANNING AGRICULTURAL RESEARCH

1. THE PHENOMENON OF UTILISATION OF RESEARCH FINDINGS IS ONE WHOLE PROCESS. EVERY LINK IS SIGNIFICANT AND CRITICAL. (Please see chart on the opposite page).
2. That is why we are compelled to touch upon all aspects that affect ultimate utilisation - pre-research aspects, research administration aspects, and post-research aspects - though in differing detail.
3. The way agricultural research is planned for the country and for the individual research laboratory affects the utilisation of research results.
4. There does not seem to be at the moment a single body in the country - official or unofficial - which has taken upon itself the task of systematically collecting the data from would-be users, the national needs, the talents available, the needs and resources and the like and do some continuing planning.
5. Besides, the way planning is now done lacks goal-orientation. It is true scientists meet

for a few days in a year to identify problems and indicate priorities. The results of this exercise are reportedly ignored and a approach is taken whenever a proposal comes up. The consequence is that this exercise is not likely to be taken seriously even by the scientists, as years go by.

6. An overall plan is annually attempted to-day by research scientists, extension scientists, farmers and administrators and it has the sanction of a common commitment.
7. This plan should be examined in an overall fashion by the government leaders at the Centre and approved. Once it is so approved, goal-oriented action should be the rule.
8. Without this national "blueprint" for action, the approach is likely to be ad hoc; and ad hoc approaches do not pay adequately in agriculture.
9. We get the impression that the present approach to priority is ad hoc, one of reacting to whatever problem poses itself at the moment. We also get the impression that the working scientists are not given a hearing. The scientific approach to planning

research seems to have given way to the subjective and fire-fighting approach of the decision-makers.

10. It is true that in our state of development we cannot go for rigid schedules but within existing limitations, a systematic approach is possible and, from the optimum results view point, desirable. This is another lesson we can learn from the agricultural history of other countries. Rules give place to policies.
11. Policies are to an organization what signs are to the highway. They are positive, they direct, and they are for the protection of the traveller. A policy is the outgrowth of repeated experiences. It represents the best conclusions for future operations. A policy should not be the result of a mere opinion or guess, for it is going to be used as a guide for someone. A rule is different from a policy in purpose and use. It is negative. Rules are brought into use by lack of observance of policies. A strong organization is one with many sound policies and few rules. Since administration is only the vehicle of policy, policy affects performance and performance is the subject of our study.

12. The existence of clear policies will also help in another fashion. In their absence, the tendency seems to be: "My will should prevail; my method should get the results we want. This makes people work at cross purposes and the common mission" suffers.

IV. RESEARCH ADMINISTRATION AND PERFORMANCE

1. Good research sells itself, it is said and the nation expects good results from the scientists. The well-meaning scientists are also anxious that they produce good results.
2. One key factor in research performance is research administration. Research has become big business in recent years in many countries and since the stakes are high, numerous studies have been made to ascertain the factors that make for peak performance in a research organisation. Their findings get corroboration from the answers we have received for the questionnaires (please see appendix) sent to the research laboratories.
3. The conflict between the specialist and the generalist is an age old one. It was thought all will be well if only the specialists head the scientific and technical organisations and more recently, scientists and technicians have been appointed to head scientific and technical and the result has been good in some organisations and not so good in others. And why is this difference? An analysis suggests that the mere

fact of a scientist being the head of a unit does not do the trick; he should be a scientist manager: he should be well versed in the art if not the science of managing or administering a unit.

Administering a research unit, it has also been found, calls for skills much more than that are required for administering an industrial unit.

4. Research Administration is a subject by itself but since research administration affects good results and good results affect effective utilisation, we may outline here some of the pointers for performance in a research institution.

5. Firstly, the results expected and resources placed there for are agreed upon with the head of the unit and the style and strategy to achieve those results are left to the head of the unit. Unit heads are held squarely accountable for results agreed upon. Secondly, the heads of the units are given the right to be right and the right to be wrong. They are permitted bona fide mistakes in their organizations. Their judgement is examined before the assignment is given but once given, they are given a free hand; limits

are certainly set but within the limits, they are free to act; and they are not required to get the approval for the details of their work. Thirdly, the man and his team are judged by the batting average and not by odd failures. And finally, the men and their ability to handle resources are trusted - they are helped with orientation, training and counsel and anything else that will make them effective on the job but they are not "controlled" from a distance.

6. The present position is that responsibility for results and the authority to use the resources to get those results do not together. The head of the unit has the responsibility for results. He does not have the discretionary authority to mobilise the resources at his disposal to get optimum results. This discretion point is kept outside the point of action. The consequence is that results depend on the odd chance of a persuasive, persistent scientist and an imaginative, understanding administrator coming together. We can hardly afford today the luxury of permitting this game of chance.

V FUNDS FOR RESEARCH

1. The chart on the opposite page gives an idea of how much money is being spent by the Centre and the States on agricultural research.
2. Proportionately speaking, agricultural research seems to get a fair share of funds. Whether the quantum of funds is adequate for the needs is, however, a moot point. This question of funds for research and extension is raised here because, as we will see later in this report, inadequate funds affect utilisation of research findings and therefore the ultimate results.
3. Just to take on relevant fact, we may consider the pre-delivery and extension worker. In each block there are 10 village level workers; and each village level worker is to serve 10 villages of 1200 to 1400 farm families, over and above what he may be assigned to do, from time to time, by the local panchayat and statistics-happy superiors. The question is a little better in the IADP district. There are 20 village level workers attached to each block and each Village Level Worker is to service 5 villages of 500 to 700 farm families.

EXPENDITURE ON SCIENTIFIC RESEARCH BY CENTRE AND STATES CLASSIFIED ACCORDING TO SECTORS
(ONLY FOR 1964-65) (Rs. in millions)

S.No.	Sector of research.	States			Centre			Total			Percentage of Grand Total.
		Rec.	Cap.	Total	Rec.	Cap.	Total	Rec.	Cap.	Total	
1	2	3	4	5	6	7	8	9	10	11	12
1.	Agriculture and Forestry	31.051	-	31.051	51.961	3.041	55.002	83.012	3.041	86.053	11.06
2.	Animal Husbandry, Fisheries & Dairy	9.005	-	9.005	20.412	0.885	21.297	29.417	0.885	30.302	3.90
3.	Scientific, Industrial & Technological Research	3.376	-	3.376	100.302	47.044	147.346	103.678	47.044	150.722	19.38
4.	Medicine and Public Health	20.693	-	20.693	30.795	0.396	31.191	51.488	0.396	51.884	6.67
5.	Irrigation & Power	7.463	-	7.463	19.140	3.052	22.192	26.603	3.052	29.655	3.81
6.	Geology Survey	6.609	-	6.609	48.590	-	48.590	55.199	-	55.199	7.10
7.	Atomic Energy	-	-	-	104.128	152.728	256.856	104.128	152.728	256.856	33.03
8.	Railways	-	-	-	9.243	-	9.243	9.243	-	9.243	1.19
9.	Defence	-	-	-	60.850	18.544	79.394	60.850	18.544	79.394	10.21
10.	Others	-	-	-	28.398	-	28.398	28.398	-	28.398	3.65
Grand Total:		78.197	-	78.197	473.819	225.690	699.509	552.016	225.690	777.706	100.0

Hindustan Times dated 27th August, 1967.

TOTAL EXPENDITURE ON SCIENTIFIC RESEARCH: AT CURRENT AND 1952-53 PRICE LEVELS
(RUPEES IN MILLIONS)

S. No	Year	Central Government		Others*		Total		Index number of whole-sale price (all commodities) Base 1952-53 100
		Current price level	1952-53 price level	Current price level	1952-53 price level	Current price level	1952-53 price level	
1	2	3	4	5	6	7	8	9
1.	1950-51	46.85	40.74	8.90	7.74	55.75	48.48	115.0
2.	1953-54	83.64	77.44	15.89	14.71	99.53	92.16	108.0
3.	1955-56	121.38	131.22	23.06	24.93	144.44	156.15	192.5
4.	1958-59	226.95	202.45	43.13	38.47	270.07	240.92	112.1
5.	1960-61	300.65	240.71	57.12	45.73	357.77	286.45	124.9
6.	1963-64	502.81	371.63	95.53	70.61	598.34	442.23	135.3
7.	1964-65	699.51	458.09	132.91	87.04	832.42	545.13	152.7
8.	1965-66	969.61	584.10	184.23	110.98	1153.84	795.08	166.0
(R.E)								

* Estimated contribution of universities, industries and State Governments for scientific research.

4. In the appendix -, we give a few examples of how important work is held up because of meagre allocations.
5. Quality apart, the current provision for this all important function is just nominal.
6. In sales promotion, it is said advertisement outlay below a particular level is as good as a waste; that there is a basic minimum to get results. This analogy applies particularly to agricultural extension. We should repeatedly ask ourselves as to whether various aspects of agricultural research and extension are getting an allocation proportionate to the needs.

VI THE COMMON GOALS

1. We have been talking about goal-orientation; and what is the goal?
2. The goal is that the research scientists and the rest in the chain assist the farmer to produce more, more economically, and more profitably, today and tomorrow. Quantitative production, economic production, profitable production and without risking tomorrow all need be simultaneously provided; and that is the goal.
3. The additional aspect in our current context, is "in record time".
4. Time is the essence. The guideline then is: WHATEVER HELPS THE MOVEMENT TO THE ULTIMATE MISSION AND WITH STEPPED UP TEMPO IS IN ORDER AND WHATEVER HINDERS THAT MOVEMENT OR TEMPO IS NOT IN ORDER.
5. Unless the research findings, the extension operations and administrative actions satisfy these criteria, the potential user of the research findings may not buy or accept them. If they do satisfy these criteria, we need not sell them - it will be sufficient to communicate to them effectively.

6. It has been pointed out that in no other country in the world such a vast area as 10 lakh acres has been switched over to the new varieties of wheat in such a short time as three years.
7. It has again been pointed out that over 100,000 acres in the state of Orissa have been switched over to TN-1 and IR-8 variety of rice in less than two years. It was also pointed out that in one area (Ganganagar) two out of three lakh acres of land were switched over to the high yielding food crops from well paying cash crops within one year.
8. Quite a few cases were mentioned of farmers smuggling high yielding variety seeds from distant states because of a) local non-availability and b) zonal restrictions.
9. Changes in agricultural methods, it has been further pointed out do not occur that fast even in the western countries. In the state of Iowa (USA) for example, it took about 6 years for the farmers to switch over to hybrid corn.
10. Heart-warming as the situation is, there is a risk in such swift switchovers. The cultivator's enthusiasm may not be matched by the know-how and the skill that should go with handling such changes.

Effecting a change is an integral operation. We have to examine therefore how effectively we communicate the research findings to the users of research.

11. This point is worth emphasising. The problem is not so much one of persuading the farmer as one of communicating the know-how effectively and in time to the users of research.

VII.

USERS OF RESEARCH - I.

1. And who are the users of the research?
2. There are 4 categories of users of research.
First will be the other research workers. The second will be those engaged in extension; and the third the farmer who applies it in his farm; and the fourth the public who buy the farm produce for consumption.
3. The research worker will use the findings of other researchers so that he can go one step further. The research units in the country seem to cater to this type of user fairly well. The scientists put their findings in writing and the findings are duly published and circulated.
4. A move is a foot to organise a clearing house at the ICAR. This is a move in the right direction. When this takes shape, one will know what research is done in which part of India and, as a result, duplication, if any, will be purposive, conscious and for a good reason.

VIII. USERS OF RESEARCH AND COMMUNICATING TO THEM:
THE EXTENSION SCIENTIST.

1. The second user of research is the extension scientist.
2. While the research scientist adds to the totality of knowledge in bits and pieces, the extension scientist fits these new findings in the total picture and brings them to the farmer in a readily usable form. The research scientist, even if inclined to do extension work, is not organised to do this work, unless of course he switches on to full time extension work. The purpose for which he visits the farms and meets the farmers is to have a feel of the reality and an appreciation of the problems faced by them; it is not to convey the research findings to him. There may be a few versatile scientists (as in IARI) who can do laboratory research and field demonstration equally brilliantly but that cannot be the rule.
3. The suggestion is not that the research findings should go to the farmer only through the extension machinery. This is only a matter of convenience. Where the purpose will be better served by the research laboratory being in direct touch with the end-user, it can be so. For example, it has been

pointed out that "in the case of long season crops like sugarcane where the cultural problems are many and the technical know-how of crop production has also made much progress, the research organisation responsible for the technical know-how should be closely associated with the extension of it in commercial culture".

4. The massive farm population running to millions, the non-homogeneity of such a population, the communication facilities available in the country and many other similar phenomena make this critical job of extension a major job in the country. Appreciating its importance, an Extension Directorate has been set up at the Centre.
5. The research findings of the various laboratories in the country are collected at the Centre by the Extension Directorate and after suitable processing by the Farm Advisory unit they are passed on to the Farm Information Unit for further transmittal to the states.
6. Perhaps because of the long chain of communication there is a certain amount of refraction and distortion effect at the pre-delivery end level. And

this observation leads us to the thought that the extension worker at every level may be provided with a well-edited and codified handbook on agricultural technology, factually correct but written in a popular style. This handbook can be supplemented by a loose-leaf binder to hold new material. Such reference tools may come handy not merely to the extension staff but to the literate farmers as well.

7. Such a publication produced centrally will have to be suitably translated into the state languages. We say 'suitably' because it has been pointed out that translators tend to translate the word with the help of the dictionary instead of translating it by meaning. They tend to keep too much Jargon in their working.
8. Another tool all agricultural workers will welcome is a publication based on questions asked by the farmers and the authoritative answers provided. This again has to be suitably edited, indexed and given to every level of the extension force for ready reference. This can also appear as a feature in INTENSIVE AGRICULTURE.

9. The Agricultural Year Book, though only in English and Hindi, is in good demand. There is scope, however, for a handbook for each state that brings under one cover the best advice available with respect to recommended varieties, fertiliser and soil-management practices, pest control, and so forth as applied to regional conditions. This can be jointly prepared by the state agricultural university, the state department of agriculture,, the experimental farms, research laboratories and other services of the department of agriculture in the state.
10. Armed with these tools, the extension staff may be able to communicate more meaningfully with agricultural teachers and researchers, when they bring the farmers' problems to them.
11. These suggestions are only to supplement whatever is currently done to train the extension force which in fact needs strengthening.

IX. USERS OF RESEARCH AND COMMUNICATION TO THEM:
THE FARMER

1. The third user of research is the farmer.
When we say this, we are referring to the sixty and odd million farm population. The newer knowledge gained, the ^{farm}/policies established must be made known to the thousands of farmers on their individual farms if full benefit is to be reaped.
2. A large majority of the sixty and odd million farm population happens to be illiterate at the moment. A growing section of the population is literate but not well-schooled. A small minority is well-educated and well-informed. And within each of these sections there are endless variations. The communication has to differ according to the audience.
3. The last category is fairly well catered to by the government publications produced at the central and state levels.
4. INDIAN FARMING, (ENGLISH) AGRICULTURAL SITUATION IN INDIA, (ENGLISH) AND INTENSIVE AGRICULTURE & (ENGLISH & HINDI) are three valuable publications. Indian Farming is a technical publication providing

definite, accurate, and detailed accounts of research conducted in laboratories and and experiment stations. The other two report current practices adopted by successful farmers in different parts of the country and of the world.

5. In the larger interest these publications may be made available to the educated farmers in the country through the post office at no cost to the recipients. The post office is mentioned because it is one of the efficient distribution channels. Expecting them to buy these journals collect the other publications from the departmental offices is leaving too much to chance.

6. Another group that deserves to receive these publications free would be the professionals in the village - the doctor, the lawyer, the priest, and the village school master - who have indirect influence on the farmers.

7. While it is true to say a farmer is illiterate it ~~is~~not true to say his children are illiterate; nor is it true to say everyone in the village is illiterate. The message can reach therefore through literature.

8. Since reading of language dailies and periodicals is gaining increased momentum, these media can be used to good effect both for generally educating the reader on modern farm technology and also for informing them on new researches. Many periodicals carry a Farmer's Column. This is a valuable media and with some encouragement can become more extensive and effective.
9. There is then the farm press. A recent survey shows that the largest number of publications (222 by the last count) in the country is relating to agriculture. Many give the impression that for want of financial support they are not doing as good a job as they are organised to do. Since popular writing is a skill and not many scientists and officials possess this skill, it is desirable that extension authorities use the existing farm press to good account.
10. There is certainly a place for official publications. For example, only the government can hope to support the neo-literate farm literature. Coloured pictorials and the like cannot be mass produced and distributed by a private agency.

11. It was pointed out by some farmers that the university publications are more to the point and pleasant on the eye than the departmental publications. If the agricultural universities are better placed for this type of publications and for this type of readers, they may be well assigned the task.
12. The situation is changing beyond our expectations. Instead of extension staff telling the farmer, the farmer is asking the scientists and the extension staff for technological information. And the report we have is that even at the state level, the necessary information is not supplied promptly. Readers of one farm magazine (AJEET) complain from time to time "that they do not get any response to their queries even from IARI." One facility the farmers need urgently then is an efficient and reliable information centre atleast at the state capitals.
13. The average farmer is resourceful and has practical knowledge if only of traditional practices. While this is indeed an asset, the long term salvation lies in the farmer seeking new knowledge.

14. To welcome new knowledge, he should have a threshold of knowledge. He should have a base to build on. His present knowledge he should have in an organised form.
15. This can be given and is given in sections of the country through class room lessons.
16. If we have to reach the vast majority quickly, we have to think of other methods.
17. One method is to expose them to organised knowledge through films.
18. For one thing, picture going is a national pastime. For another, our ability to take documentaries is of a high order. If we could use these two opportunities, we can make instructional films on farming practices and take them round in mobile theatres and reach large masses in a short time through their mother tongues. This can be one of the major joint functions of the Extension Directorate (at the centre) and the scientists.
19. The films can be supplemented by books on the fundamentals of farming written in; say, programme instruction style and widely distributed.

20. To say the obvious, films dealing with farm practices are almost as useful as demonstrations. They give audience convincing proof of proper procedures, for they see it with their own eyes. Moreover, a film unlike a demonstration, can be slowed down at crucial points or even repeated if the audience desires. And they can be taken to the farmers door step.
21. ~~And they are not.~~ Even farmers in IADP districts report that they have not seen any of our agricultural films.
22. There are many topics that are of day to-day interest to the farmer. One of the problems farmers face is getting help when a mechanical equipment goes out of order. Many do not know even the first aid aspect of repair. A how-to film on, say, "How to maintain your tractor" with a few hints on the first aid aspects, should help reduce down time of farm equipment.
23. We learn that we have only a handful of films and even these are of a general nature. (please see appendix). Though we have some very able documentary producers, why we have not resorted to

this mass media of communication in a big way is hard to understand. In our current state of literacy and information, this should have got top most priority but it has not.

24. The group that is classed as illiterate is today communicated to through the radio. Most stations have a daily programme for the farmers and this is well received.
25. The farmers have a suggestion or two. They say that the discussions should be live discussions taped, and not play-acting ones. They want more factual information and less entertainment and pep talks.
26. They also point out that items are referred to in the radio talks without checking whether they are available in the market or not. The listeners eagerly rush to market, often far out of their farms, only to learn that the item is not available and no one knows when it will be available'.
27. A few pointed out that we may emulate Philippines in having a special agricultural broadcasting station, in having educational programmes given

at a stretch for two to four hours to which the farmers can listen to, even as they are on the job in the field.

28. The ideal is face-to-face communication between the extension staff and the farmer.
29. This is hardly likely with the present force of extension staff. How a village level extension worker can serve 5 villagers with 500 to 700 farm families is difficult to visualise. In the non-IADP districts the position is still worse.
30. Apart from the fact that they are spread thin, the reports are that the extension workers even in IADP districts are not available for their main function, namely, agriculture extension. They have so many jobs to do for the Panchayat itself. They have then to wait on visiting officers - unless the officers behave like DMK ministers^{*}, this position will remain in the country. And because of the character role situation, the extension worker has to be superior-oriented and not farmer-oriented.

* One of the first circulars the DMK ministry issued was that officials need not wait on them when they visit the districts and in fact should meet them only if required to do so.

31. The village level workers are overworked. They have to make a number of personal sacrifices and they do not have often the working facilities; and even the compensation of good pay is not there. Many a square mile they have to cover with local conveyance. Their transport facilities have no relevance to the area they have to cover.
32. Then of course they have to collect statistics - they seem to be collecting some statistics or the other round the year'. There is the regular paper work, of course.
33. Added to it are the frequent transfers, for one reason or another.
34. The extension worker remains therefore an extension worker only in name and perhaps will remain so until many obstacles in his way of doing his main job are removed
35. It has been pointed out that the turnover rate of the extension force is high and that only the 'third rate' people come for this job, and even they don't stay long.

36. Under the present conditions this is understandable. And what is the answer? Part of the answer lies in a) paying the field worker a salary a little over to what is paid a research worker in a laboratory, b) providing a little more for his creature comforts like living and travelling, and probably c) allowing him a higher age for retirement.
37. The other part is much more important. One needs a zeal and flair for extension work and the selectors have to keep this in mind. Putting the emphasis on formal qualifications in selecting extension workers is likely to defeat the purpose.
38. Secondly, exposing a person to a series of lectures is not training the extension force for the job. The training should be for the field work. In particular, they should be given, on a guided practice basis, skill development training in persuasive communication and demonstration.
39. Again the information input should be up-to-date and reliable. The extension force should have frequent in-service training. If they are cut off from the reservoir of scientific enquiries and investigations, extension workers will soon have little to "extend".

40. We saw there are so few last level extension workers. This handicap is partly made up by agricultural research stations and agricultural universities through field days, farmer weeks, and seminars for boys from the farm. Any step taken to give the farmer organised information in a systematic way is a step in the right direction. In a farmer-oriented approach, there is a place for more than one agency to render service, and one need not fear duplication. In fact, in a situation like ours, what is important is that the chance element should be minimum and this is provided by a little overlapping than by permitting a few non-man areas.

X. USERS OF RESEARCH AND COMMUNICATING
TO THEM: THE CONSUMER PUBLIC

1. Before we move over to the utilisation aspects we may quickly consider the other, though indirect, user of research, namely, the consumer.
2. Either for reasons of quantity or quality, the research scientists may come up with a new type of seed, say. The farmer takes to it. He produces the crops and the consumer may not buy it.
3. Tainan 3 story is a case in point. It is a high yielding variety paddy. It was promoted with vigour by the officials, about a year back. The Kerala farmers took to it enthusiastically and reaped a good harvest too. There was a great celebration during the first year of introduction. The very second year there was a set back. Reason? Tainan 3 paddy gets a lower price than other varieties in the market.
4. Tainan 3 is a Japonica variety and the South Indian consumers are not used to this variety - "it is too sticky" - and if they have a choice, they would avoid it. The farmers have second thoughts on Tainan 3 within a 12 months period.
5. Probable consumer resistance could have been forestalled with advance publicity. Or probably

the produce could have been diverted to an area where this variety may be quite acceptable. Steps were not taken in advance. Who should do it is a matter of detail. What is significant is this acceptance by the consumer public of an item the researcher wants the farmer to take to.

6. Another case is the resistance to the hybrid bajra. It is believed, may be quite wrongly, that the high-yielding bajra is not nutritious, not healthy. There is similar resistance to all high yielding varieties.
7. It should have been easy to take the help of nutrition institutes in the country. Their findings could have been given adequate publicity through the press and the radio.
8. A third example is the Mexican wheat. The farmer has gladly accepted it but there is severe consumer resistance because of the fact that chapathis and puris made out of it are reddish brown in colour instead of white to which white the customer public are used.
9. For all practical purposes, these are cases of promoting a new product. While communicating the important research findings with the public in non-technical style through the medium of press,

is desirable, to build an overall acceptable climate for the 'new' product is essential.

10. The build-up communication should be well in advance, much before the produce in the market. Who should do it is a matter of detail. What is significant from the point of utilisation by the farmer is this acceptance of his produce by the consuming public.
11. The farmer, it has been pointed out, is in a new and great mood to act. We should 'exploit' that mood to his benefit and the nation's benefit. One way to do is not to bypass essentials in our enthusiasm. If we do bypass and we get consequences, it will leave a permanent mark in the farmer's mind. He will hesitate more than he ever did before.

XI. USES OF RESEARCH AND COMMUNICATION TO THEM:
GENERAL PUBLIC.

1. While we are discussing communication to the farmer, we may briefly discuss another section that has to be taken into account. Though in an indirect sense, another 'consumer' of research is the government, legislative, administrative and public leaders.
2. By their attitudes and actions those leaders can affect the utilisation of research in good measure. They may limit or withhold needed support. What they do will normally depend on the information they have on the subject. While a few of them do take the initiative to keep themselves posted, a large section form their opinion on what is fed to them. The question then arises. How are we communicating with them now and how effectively?
3. Our information is that this is not done in any conscious or organised or continuing form at the moment. As and when one or the other agency is affected, memoranda are submitted. Obviously such memoranda are looked at as partisan documents. Whether to the farmer or the legislator, it is the successive cycles of communication that have a cumulative meaning and effect.

4. A central or non-official body should therefore do the "lobby" work on a continuing basis. One way - it is only one way - is through well-produced, readable publications to keep people informed on what is happening here or elsewhere in the world of agricultural research, education and extension and their implications for us.
5. Indirect influence plays an important part not only for legislative and administrative support but for adoption of new methods. While journals like INTENSIVE AGRICULTURE do tell the success stories one wishes these are flashed in the popular press, in the English and language dailies as well, more and more often. The general public today read only the grim tales of rain failure or crop failure or foreign aid failure. They do not read the magnificent jobs of our kisans and all that support them. They should. This indirectly influences the farmer in favour of newer technologies.
6. In a democracy like ours knowing the right thing or saying it the right way is not enough. We have to influence the power centres through timely and persuasive communication. Even right cases have to be powerfully pleaded for and all the time.

CHAPTER XII

DIFFUSION & ADOPTION

1. Two interrelated process help bring new ideas from their source of initial development to acceptance by farmers. These processes are called diffusion and adoption.

The diffusion process refers to the spread of new ideas from originating sources to ultimate users.

In the case of agriculture, it is the process by which new farm practices or ideas are communicated from sources of origin, usually scientist, to farmers.

The adoption process is a mental process through which an individual passes from first hearing about a new idea to its final adoption. It may be divided into stages. A division commonly utilised by rural sociologists is:

1. Awareness. The individual knows of the new idea but lacks information about it.
2. Interest-information. The individual becomes interested in the idea and seeks more information about it.
3. Evaluation-application-decision. The individual makes a mental application of the new idea to his present and anticipated future situation and makes the decision either to try it or not.

4. Trial. The individual uses the new practice on a small scale to validate its workability on his own farm.
5. Adoption. The individual uses the new practice on a full scale and incorporates it into his way of farming.

At any point in this process an idea may be **rejected**. Even after adoption of an idea, the process may be repeated when alternative is presented.

A major difference between the diffusion process and the adoption process is that diffusion occurs between persons while adoption is an individual matter.

2. Relatively speaking, communication of agricultural research findings to the Indian farmer and getting an assent is a fairly easy process. Not so is the utilisation thereof. There are many, complex, and changing variables - some within the user himself and some very much outside him.
3. Unless the integrated nature of agricultural production is borne in mind, we cannot contribute **quite significantly** to the mission. Thus it would be a great fallacy to suppose that full irrigation by itself will make possible a more intensive succession of crops, a

greater variety of crops and higher yield levels.

The direct effects of full irrigation, says Dr. Arnon, are leaching of plant nutrients, increased salinity, reduction of soil organic matter, impaired soil structure, rise in water table, increased incidence of diseases, pests and weeds.

4. Switching over from one method of doing anything to another method is not at all easy. Inertia forces ~~alone~~ will see to it that the status quo is maintained. This is true for even the well-placed; it should be more so far the farmer.
5. The farmer has many peculiar handicaps. One is historical. He has been singled out for sad treatment for centuries by the zamindar, the money-lender, the trader, the government official and more recently by the political worker. He feels insecure in the presence of an official or a stranger. And quite naturally "Once bit, twice shy" is too true of him. A single unhelpful incident, intended or otherwise, sends him back into his shell.

7. A booklet issued by the Project Officer of an IADP on 20 August 1966 recommended hybrid jowar in paddy area. The people who listened to the advice suffered a heavy loss that season. One farmer later found a National Seeds Corporation brochure saying "hybrid -- sorghum should be sown before July 1, as far as possible. "The others did not . All that they chose to do was to become very guarded in their response to advice provided by the specialists. No wonder.
8. Again, land is the sole source of sustenance for the farmer. If a season fails, he has nothing to fall back on. He cannot afford to fail - even one season. He may make pretty little by the old method, and still he would prefer it to the newer method which is declared to be highly-promising.
9. Economic privations apart, if he fails by trying a new method, he may lose face and losing face is a major tragedy in a rural setting.
10. This being the situation, only one thing is convincing to him and that is a neighbour trying the newer method and succeeding. It is not merely a case of 'seeing is believing'. It is a case of 'seeing the neighbour in action that is believing'. All

7. A booklet issued by the Project Officer of an I.A.D.P. on 20 August 1966 recommended hybrid jowar in paddy area. The people who listened to the advice suffered a heavy loss that season. One farmer later found a National Seeds Corporation brochure saying "hybrid sorghum should be sown before July 1, as far as possible. "The other did not. All that they chose to do was to become very guarded in their response to advice provided by the specialists. No wonder.
8. Again, land is the sole source of sustenance for the farmer. If a season fails, he has nothing to fall back on. He cannot afford to fail - even one season. He may make pretty little by the old method, and still he would prefer it to the newer method which is declared to be highly promising.
9. Economic privations apart, if he fails by trying a new method, he may lose face and losing face is a major tragedy in a rural setting.
10. This being the situation, only one thing is convincing to him and that is a neighbour trying the newer method and succeeding. It is not merely a case of 'seeing is believing'. It is a case of 'seeing the neighbour in action that is believing'. All

else experimental farms he is able to explain away.

A CASE HISTORY

11. A case in point is a farmer in Maddur, a town in IADP district of Madhya in Mysore district. Before he came into the scene in early 1965, for two years, efforts were actively made by the agricultural extension staff making the farmer to take to the newer method of cultivation. The farmers of Maddur stuck to the old method.
12. This youngman was till then a city (Bangalore) dweller and the farmers were "sure" he would fail miserably. Taking it as a challenge, this novice farmer studied the subject, consulted the specialists and went about his job systematically.
13. In the very first crop (1965) he harvested about 220 quintals of paddy in a farm of 12.5 acres - held a record in the past 50 years. (Incidentally, though drought conditions prevailed, his performance early 1967 season is 400 quintals). The neighbouring farmers who "came to scoff remained to pray"; approached this youngman and asked him what he did to get such outstanding results. This farmer explained in detail.

14. Within two years, the farmers of Maddur are enthusiastically emulating methods of this young farmer - early sowing, line (or Japanese method of) planting, spraying etc. etc. The result is that the Maddur farmer's estimated net income has increased between 5 to 25 per cent. More than their increased production, what is significant is the switchover to modern farm technology. When the power tiller was introduced in the state, our novice farmer was the ONLY ONE who came forward to buy it. Today, in less than two years, in this small town, three farmers own power tillers.
15. Even as far as the approach is concerned, the neighbours are one crop behind the farmer in question. The reason ~~is that~~ they take a guarded approach. They let this youngman try out a new method and succeed; and once he does succeed, they enthusiastically follow his lead.
16. This farmer, commenting on the above phenomenon, explained that marginal successes do not appeal to his neighbours; that his neighbours consider only such propositions as offer substantial returns; that they argue the additional inputs have made their risk much too much.

17. His neighbours take their problems to him and he in turn takes the problems to the departmental offices, research scientists and agricultural university teachers and come back with possible solutions.
18. This case history brings out a few points to the fore.
19. It points out that we have to take the farmer as he is and work with him. If he is conservative, he is conservative; if he has prejudices, he has prejudices. What is pertinent is that he is intelligent and resourceful, that he can apply himself.
20. The farmer that means business hesitates to act on reading a piece of literature, for that is only science for him. He wants the art of doing it; and that is why doing by a fellow farmer is convincing to him.
21. 'Show how' induces him to action. The National Demonstration scheme and the IADP Result Demonstration scheme have proved this beyond doubt the point that the demonstration-on-the neighbour's soil is a very effective way of inducing the farmer to try out a new method.

21. The value of such demonstrations has sometimes been overlooked. It has a direct effect upon the farmer and also has an important effect upon the extension himself and on his work. Such a demonstration serves two purposes: 1) It conveys a lesson and imparts information to the farmer who is conducting the demonstration and to his neighbours; and 2) it demonstrates to the farmer and to the community the practical worth and the value of the information the scientist has given him. Every successful demonstration of this character not only teaches the farmer the value of better information on agriculture but also impresses that person with the fact that the one giving the instruction leading to this demonstration has much valuable knowledge worth disseminating.
23. The one little drawback in such demonstration is that the farmer feels these schemes do not emphasize cost factors or availability (of input) factors. Much more effective, therefore, is the show-how by his own neighbour.

24. This is not to say that other methods of diffusion are not effective. They are effective though in different degrees. (Please see appendix) The cost versus return ratio also varies between one effort and another.
25. This is to say ~~that~~ here is a singular possibility. We can locate such local talents (farmers) and help to make them 'multipliers'.
26. Even now, distributors of farm products, extension scientists and research scientists locate and work through such farmers. The thought is that they can be made a local power for good in the adoption process.
27. What the farmer needs is a "general practitioner" to go to who, in turn, can go to the specialists; and at the moment, he does not have general practitioners to go to: they are not just there. The village level worker - an ill-paid, poorly - schooled, and whimsically administered worker - cannot be expected to do much. ~~The~~ farmers have therefore, to go direct to the specialists and some of the specialists happen to be status-oriented officers, and most farmers are not yet geared to meet them.

28. One of the major wants of the farmer is that he could go to someone who is physically available, psychologically inclined to help and technically competent to guide. The enlightened and innovative farmers can play the role fruitfully, since such men are accessible, they show and then tell, and they are able to communicate in a language the brother-farmers will understand, and they have a local stake.
29. The logical "general practitioner" is the informed helpful farmer in the locality.
30. The Government can designate them as "Farm Advisors" for the area and help them to be effective as farm advisors. Even without being so named, they help their neighbours with pleasure.
31. The suggestion is not that we should make them local farm leaders in any official sense. In fact, most will resist any such attempt. They would prefer to be honorary workers. The suggestion is that we treat them as a local resource and strengthen them with continuing information, facilities, and tools.

32. One way to help them to help others is to let them have ready access to a Central Information Centre (to be set up) which is supplemented by a team of specialists. These farmers should be able to get the specialist to the field in emergency situations at short notice.
33. Incidentally, the questions asked of them the specialists can answer over the radio almost immediately, so that many more can benefit.
34. Another way is to get such farmers together periodically to exchange notes among themselves.
35. Besides supply them with information regarding technological developments, equipping them to be local teachers and counsellors to the farmers through training and tools (like film slides) should help them help others. They can fruitfully organise and conduct discussion groups for fellow farmers in their and neighbouring villages.
36. One "difficulty" that may arise is that such progressive farmers will speak out and press for the fair thing by the fellow-farmers. If we welcome such "protests" as an opportunity to better fulfil the mission, it is well. If we tend to be officious to them, this step will only help partially.

37. One farmer used to meet officials from time to time and press for legitimate assistance for his farm community. So the officials know him as enterprising. There was a crop failure in his community - the farmers of the town chose to grow hybrid jowar on the advice of and with the instructions of the state officials and the crop failed. The press chose to cover this failure. There was a controversy, resulting in an enquiry. The local officers assumed that this enterprising farmer was at the back of all this "mischief", though he was actually innocent.
38. We get the impression that the officers do not like such "trouble-makers". We cannot blame the officers either, since under the present scheme of thing, when anything goes on wrong and is found out, the approach is to find out who is wrong and "fix him" up. The helpful approach of finding out what is wrong and fixing the remedy is yet to come. And the later way lies modern administration.
39. We have referred to this aspect because if we want such farmers to form part of the team that makes possible adoption of new methods by a large section of the farmers, officialdom has to make some adjustments.

40. Both in the diffusion and the adoption process, the farm organizations in the country like Tonnage club and Bharat Krishik Samaj can help considerably. These organizations are dynamic bodies and can be use as good resources. There is a feeling in some circles that these organizations do not get support from the government. In addition to general supply, ad hoc support for jobs they are equipped to do can be given to good purpose. In every aspect of diffusion of modern agricultural technology, these organizations can be used.
41. A case in point is the project of the Tonnage club by which farmers' sons have been trained on a "sandwich" basis and planted in selected villages to demonstrate effective practices. Given this encouragement, members of the Tonnage club should be able to do more of this good work.
42. There is however scope for Farmers Association as in Taiwan. The services provided by the Farmer's Association in Taiwan are integrated and made available in good time and with good accessibility.

ORGANIZATION CHART OF FARMER'S ASSOCIATIONS

Taiwan Provincial Farmers Association

22 County/City Farmer's Association

324 Township Farmer's Associations

Board of Directors
and Supervisors

General Manager

Accounting Section	Credit Section	Agriculture Extension Section	Marketing Section	Administrative Section
-----------------------	-------------------	-------------------------------------	----------------------	---------------------------

Small Agricultural units in
4,854 villages

Members (770,174 farms households)

43. What then would be the major role of the extension force? Traditionally, extension workers bring to people the pertinent research information available; interpret and demonstrate its application to the immediate situations involved; and, through the most effective methods known, encourage the application of such research in solving problems. In the current Indian context, because of the inadequacy in number and time available, they can concentrate on two functions - (a) to take the farmers' problems to the research and extension scientists; (b) to bring to the attention of the authorities the remediable problems the farmers are facing. They can generally work with and through the leading farmers in the village. If and when they are relieved of their agricultural functions they can be trained as

agricultural technologists as Australia does.

An efficient extension machinery must facilitate to two-way traffic. The problems of the farmer must be carried back to the authorities as well as to the laboratories according to their nature. Further, enlightened and innovating type of farmers should be identified and associated with the process of extension. But no such efforts exist in the Kerala State. Several instances of innovating farmers were reported. A farmer designed an improved plough with 8 leaved which he called "wetland putler". Though the plough proves its efficiency the Block authorities refused to take note of this as there was "no provision" for such implements in their scheme. Another farmer in the Kunnummel N.E.S. Block in the State who introduced his own version of the Japanese method of paddy cultivation was able to double his yield and win the crop yield competition. No one seems to have pursued it further. A teacher-cum-farmer in the Trichur district designed and implemented a new irrigation scheme with

44. As we have indicated earlier, this study does not aim to examine either the research or extension agency or even to describe them. It seeks only to highlight such aspects as have high relevants to the phenomenon of diffusion and adoption of research findings.

f.n. carried on from previous page:

the cooperation of a few fellow farmers. This has helped to convert 80 acres of single crop lands to triple crop lands. Now they have the blueprint of a bigger scheme to produce one lakh paras of paddy additionally in an adjacent area through a similar scheme. Instances of such innovating farmers could be multiplied. In Japan, the innovating farmer is closely associated with the extension programme. Identifying leading farmers and encouraging them actively to assume leadership roles in community development is a desirable extension technique and hence, should be rigorously pursued. Technological change and its Diffusion in Agriculture - is existing institutional set-up adequate? By M.A. Oommen. AGRICULTURAL SITUATION IN INDIA, October 1966, p.527.

AGRICULTURAL SITUATION IN INDIA OCTOBER 1966

Several surveys have established that it is the big and large cultivators who have been the chief beneficiaries of cooperative credit. For the initiation of technical change and probably for some measure of innovation the rich farmer with higher resources and drive must be the focal point. But for the wider diffusion of technological change, reliance will have to be placed on the large number of small cultivators. This means placing at the disposal of the farmer enough resources to bear the cost and risks involved in introducing technological change. The success of the farm production programme will depend in providing adequate credit. The productivity needs of the farm rather than the value of securities offered should determine the size of the loan.

No single dose of extension effort can motorise agricultural growth. It should be a comprehensive continuous process.

The success of new methods should be assessed at every stage and the reasons for failure identified for future guidance and rectification. This is essential for the spread of new technology. But such follow-up efforts are significantly lacking in Kerala.

SUPPORTS FOR ADOPTION: CREDIT

1. When we commend a new research finding, we tend to assume other things are equal and other things are not equal for an average farmer. He is differently equipped to face the implications of adopting the new ideas.
2. Application of new research and modern technology means much more outlay than needed for conventional farming. This additional outlay is occasioned both by the special inputs like fertiliser, pesticide, etc., and the added preparation like irrigation facilities called for. The farmer cannot utilise research effectively unless he has or has access to the capital required - the land development capital required for preparing the land for modern agriculture; and the crop raising capital for purchasing the inputs that are required for a particular crop and capital for sustenance during the season.
3. Capital for land development and crop raising is provided by several agencies. The more important ones are (a) the professional money lender; (b) the government; (c) the co-operatives; and (d) friends and relatives. Their proportionate share a decade back is shown in the accompanying chart.

PATTERN OF SUPPLY OF AGRICULTURAL CREDIT

Credit Agency	Proportion of borrowings from each agency to the total borrowing of cultivators*	
	1951-52.	1961-62.
Government	3.3	2.6
Co-operatives	3.1	25.5
Relatives	14.2	8.8
Landlords	1.5	0.6
Agricultural Money lenders	24.0	36.0
Professional Money-lenders	44.8	18.2
Traders and Commission Agents.	5.5	8.8
Commercial banks	0.9	0.6
Others	1.8	13.6
	100.0	100.0

4. In recent years, the role of the cooperatives is becoming more important, thanks to substantial credit assistance from the Reserve Bank.

5. Although cooperatives are reported to have shown impressive progress over a period of ten years, their performance rising from 3.1 per cent (1951-52) to

* Percentage relates to total borrowings in 1950-51 and cash borrowings in 1961-62.

25.8 per cent (1961-62) and are well-intentioned, the way they operate seem to defeat at least in part, the purpose for which cooperatives have been established. Firstly, the provision of capital is not timely. Secondly, it is not adequate. Thirdly, it can be said that all eligible cultivators do not get credit assistance. At the delivery and levels, considerations other than goal-orientation are said to prevail.

6. Inadequate as the funds are, if the intended assistance is to be given to the farmer in time, the procedures have to be modified. One recommendation is that each society appoints a person who has both competence and integrity and that he be allowed to operate as chief executive within the policies laid down by the general body. The day to day decisions should be left entirely to him and they should not be made by the board of directors month after month. This may call for a revision in the constitution. But unless the man on the job is allowed to discharge his functions and unless his performance is measured by the overall results, the assistance that a farmer gets through the cooperative society will not merely be problematic but will change, from year to year and add one more uncertainty he is already facing.
7. Secondly, the procedures will have to be simplified and the rules made realistic. If the rules are

unrealistic or unrealistically interpreted, the applicant is encouraged to lie. This way we corrupt the unsophisticated and undermine the moral fibre of the rural society. Having done this may be unwittingly, we accuse the farmer of "mass scale lying".

8. Both for reasons of convenience and confidentiality, many farmers continue to take loans from the village moneylender. Not that they are happy with his high rate of interest but they set high score on timeliness. One farmer who has gone back to the money-lender from the cooperative bank said that he went back to the money-lender because "in the end the cost becomes the same, whether you take it from the money-lender or the cooperative bank."
9. Partly because of the size of the problem and partly because of its nature, development of the land will remain the land-owners responsibility and it is well to encourage him to discharge that responsibility through adequate land developmental capital help.
10. Particularly in irrigation what we did 100 years back we do still, namely, we leave it to the rain gods to determine where we will be in agricultural production any year. Ingenuities in irrigation are common knowledge but they are not common phenomena. While the

immediately. Incidentally, at the moment the urban property and the agricultural land are not given the same status. We can hope the proposed Agricultural Finance Corporation will remedy this indiscrimination.

13. A news item dated July 25, 1967 says that Agricultural Credit Corporations will soon be set up in all States" to provide short term loans to farmers and that a Bill enabling the government to set up such Corporations would soon be introduced in Parliament." This is welcome news to the farmer and since in the very nature of things this idea to be a fact will take many months, it will be in the farmers' interests to let the Agricultural Finance Corporation go into action soonest.

14. All this credit assistance will avail only if technical assistance is given simultaneously with it. Cases have been quoted how with their unlimited enthusiasm, limited knowledge and enough credit assistances, farmers have burnt their fingers. One cannot adequately emphasise the integral nature of farming. Single approach or one time approach hardly helps the goal achievement. The many variables and the inter-relationship should be brought to him by all media of communication in time and repeatedly.

State should do all that it can, individual farmer should be encouraged to do what he can to arrange local irrigation. This will be a little more expensive but this will be a little more certain than the seasonal rain.

11. Over the counter facilities are important to the farmer. Perhaps on the basis of each man's land and his capacity to raise crops, "overdraft" limits may be set and we can let the farmer avail of the overdraft facilities. It is true a few will take undue advantage of these facilities and use the loans for non-agricultural purposes but by this calculated risk a larger section can benefit. A yearly review can help to discourage the other section. Undue effort to safeguard against blacksheep adds to the cost and reduces the quality of the service. Providing for the few blacksheep could mean decelerating progress.
12. One way by which the farmer can be helped is by the State Bank and other banks in the country going to him and extending credit for land development purposes and crop raising purposes. The offer of the scheduled banks to set up an Agricultural Finance Corporation for farm financing is a thoughtful and timely one and should be accepted and the green signal given

15. One key area in which he needs assistance is farm management including cash management. Most research institutions inform they do not have on their staff an agricultural economist. Agricultural research in the country does not seem to take the economic impact of each recommended practice on total farm businesses studied, as an integral part of the research.
16. There is a third element of capital, the risk capital. If the farmer fails one reason, he needs capital to recover. His staying power is low. For him, it is not loss of one crop; it is a loss of only crop. If by using a new method the farmer fails to get the harvest - even the quantity equivalent to his conventional ones - he should be protected from the related risk. Such risk coverage provided by the Government should cover him to the extent of his conventional harvest plus a little more to cover extra investment by way of additional inputs.
17. When we remember the emotional loss, this compensation is hardly sufficient. Money hardly makes up for the loss of confidence and cannot redeem his self respect. Even so, a crop insurance scheme will encourage many more to "take a chance" on newer technologies, as it has done in countries like Japan. Only at the time of surplus, however, the farmer should be required

to pay towards this cost of insurance. The sooner we provide such a risk coverage, the more effective and extended will be the research utilisation. If we delay a single sad experience can make him a disappointed customer and winning him back is indeed a difficult job.

18. The advantages and benefits to be derived from crop insurance are well-known and have been eloquently listed in a report prepared by the working party appointed by the FAO in its session held in Bangkok in 1956 (please see appendix).
19. The place of crop insurance in higher agricultural production does not seem to be adequately recognised in the country; otherwise, a crop insurance scheme would not have been in the being considered stage since 1947 (Please see appendix).
20. The crop insurance bill that will shortly be taken up by the Parliament deserves a close look. It does not seem to be farmer-oriented. The farmer cannot be hoped to observe all the paper formalities; even if he does, he is not likely to get relief in time.
21. The other risk the farmer is asked to take up by modern agricultural technology is the risk in net

income. Some times, he gets a better rate and a better net income for his produce if he produces less!

22. Greater production, we saw, means greater capital, greater risk, greater effort and greater strain. Unless this is made worthwhile, the farmer may go back to the state of producing for himself instead of producing for others as well. This takes us, therefore, to the urgent need of a price support for the farmer.
23. Before he goes to sow the seed, he should be assured (as the farmer is assured in Japan) of (a) a price for his produce (b) a market that will take his produce and pay him cash. If he is not provided this price support, one or two possibilities will be there. One possibility is that he will not repeat his performance. The second is he will switch over to such crops as will give him good and ready cash. Price support, therefore, is an essential element of assuring that the farmer goes for the best known methods of food crop production. Every day delay in giving this support will affect the mission of higher agricultural production and productivity.
24. Unless his legitimate risks are covered and unless he is enabled to benefit in the net income, it is hard to keep the farmer's motivation for high production.

SUPPORTS FOR ADOPTION : INPUTS

1. Adopting modern methods means using certain inputs in certain quantities at certain definite times. If the inputs are not given at the right time, the expected results do not turn up.
2. For example, fertilisers play a great role when farmers go in for high yielding varieties like hybrid jowar, hybrid maize; and in paddy varieties like IR-8, Taichung Native I, Tainan 3 etc., timely application is critical. In respect of paddy, for instance, it is at the transplantation time.
3. Other than cash, the major factor in affecting the inputs at the right time is the supply of fertiliser and the like. The present arrangement found even in I.A.D.P. districts occasions a number of distribution breakdowns. Meaning thereby the input is not available to the farmer at the time he requires.
4. Oddly enough, at times, it is not the physical availability at the local co-operative store that accounts for such failure. What accounts for the failure is the procedural delay at one link of the chain or another.

5. A case was mentioned to us where stock was available at the co-operative store but the store people refused to issue the material because they had not received "release" instructions from the BDO. When the BDO was approached he said he had not received instructions from the higher-ups.
6. When the case was followed up it was found that the procedure involved the director instructing the deputy director; the deputy director instructing the district agricultural officer; the district agricultural officer instructing the district committee; the district committee instructing the BDO and BDO instructing the panchayat council, panchayat council meeting after of course obtaining the necessary quorum and then instructing the BDO and the BDO issuing instructions to the co-operatives to release the material !
7. Very understandably such a chain of formalities makes for a few months' delay and agriculture from its very nature cannot stand even a few hour's delay - leave alone a few months' delay. Many cases have been reported of how farmers have gone through the first and important phase of the crop with or without fertiliser, either buying them at enhanced rates or going without.

8. One adjustment we can consider is that the Director of Agriculture issues instructions to the co-operative stores direct, to issue the fertilisers on a prorata basis, with a copy "for information" to all the intermediate agencies. Each person's quota can be revised year after year, if necessary, on the basis of the man's acreage and performance. Such direct instructions instead of discretionary instructions through a number of non-operative channels would enable the man to get the materials in time. Also, he will get his share like anybody else and there will be a sense of justice.
9. Distribution of fertiliser and the like through primary cooperative societies is a vast operation and in a vast operation, some slip-ups are understandable and complaints should not be taken by us unduly but we should repeatedly clear ourselves of the charge of "lack of understanding of rural needs and lack of responsiveness to rural demands." In the rural setting, every little ~~things~~ matters and every slip counts.
10. But the aim or the mission should always be before us. And the aim is that the farmer gets the inputs in time, if possible at a normal cost and, if necessary at a higher cost, but in time.

11. If he does not get the inputs, in time - even one of the inputs - the farmer risks results - he may get partial results or poor results.
12. The present distribution system may occasionally be unable to deliver the inputs to the farmer in time. From the final results point of view, it will be desirable that the farmer has an alternative - an authorised, Government-blessed alternative not the underhand one. That alternative may be a little more expensive but when compared to the losses he will otherwise make, this extra cost may not be prohibitive. In the net he will be a gainer. This alternative only a few may be able to avail of but they should be able to.
13. It is possible that this alternative may operate so helpfully to the farmer that the farmer may avoid the other channel thoughtfully provided by the state. In that unlikely event, the state should be happy that the farmer produces the goods without bothering them. Self reliance is what the state too aims for the farmer. The state is not happy if the farmer is in a pathetic state.

14. At the moment it is a Hobson's choice. The farmer has to get his items from the cooperative stores and there are at times rules that one item should not be supplied without the other; and if the other is not in stock, and even if the farmer is willing to take the one that is available, he will not be allowed to take because the rule is all sacred !
15. In a large organisation rules have to be inviolable; only, the final results get hit.
16. The suggestion then is that we permit non-official outlets for inputs. The further suggestion is that these non-official outlets can be chosen from those that have proved their integrity beyond question over the years. In the non-official sector, there are quite a few organisations that are non-profiteering, that are customer-oriented, that have practices that are above board. These organisations can also be permitted to service the farmer.
17. This is in addition to the existing cooperative or other system, not instead of. One may describe this as "unequal competition". If it is competition for timely service, perhaps it is. If we have to

make a choice between the mission and the means of achieving the mission, the choice is obvious. Is optimum agricultural production through scientific methods important enough? Can we suffer a situation where the ultimate mission suffers for want of an alternative?

18. It is much better then to interpret this suggestion as a way of stepping up the timely service quality of the cooperative machinery in the country.
19. Farmers have reported that when the inputs were distributed by the agricultural department, "things were better". The point is that the departments can continue to distribute the inputs. Only, the farmer should be free to take his quota card and draw from one of the alternative agencies, depending on his convenience. The distribution should be farmer-oriented and have the emphasis on timely service.
20. One may describe this as duplication. Actually it should be described as a provision to prevent failure of the final mission. The failure of the final mission is much more expensive than this cost of duplication. The best way to help the farmer is to remove the hindrances in his way.

21. This principle of alternative should be applied in other areas of support to the farmer, particularly when mechanical cultivation is commended. At the moment, most of the repair facilities are with the governmental agencies.
22. To illustrate the implications of this phenomenon for the mission, we may consider an incident. A farmer approached State the Government on June 14, 1967 for the services of a mechanic to overhaul his power tiller. Reminders were sent and personal calls on concerned officers were made. The farmer received assurances that the mechanic would be there "the next day" but the mechanic did not turn up. On July 18, the farmer decided not to lose any more time and promptly got the services of a pair of bullocks, "a retrograde step in mechanical cultivation I would like to avoid but the job has to be done."
23. Talking of fertilisers, there is a local belief that continuous use of synthetic fertiliser will affect the texture and fertility of soil, 'ruin the land'. Instead of making it a matter for controversy, it seems discreet on the part of the authorities to make green manure an integral part of manuring. In what combination to use and how to use should form

form part of the farming instructions.

24. A minor matter regarding green manure is that the farm population should be helped with an alternative like coal for the fuel. Until it is done, items like cow dung will not be available for manuring purposes.
25. While modern farming means more production, it also means more hazard for the plants. The soil congenial for the plant is also congenial for the pests ! And when the pests turn up, they take the shape of an epidemic. Unless prompt remedies are taken, the loss can be total. Writing a letter to the authorities and hoping for timely help is unrealistic, not because the right person is unwilling but because the setup is not geared for such prompt trouble-shooting operations. In such cases, it should be possible for a farmer to get in touch with an Information Centre and a Team of specialists at the State Capital over the phone and get a prompt and reliable reply. The specialists attached to this centre should be able to rush to the trouble spot. Unlike in industry, in agriculture, if trouble shooting is not done in time, overnight, the loss may prove total.

26. Even in this matter, and more so in this matter, alternate sources of help can be thought of. One can be the nearby agricultural university. Another can be a cooperative poly-clinic of plant doctors who may be partly supported by the state with a subsidy. A third can be a Plant Protection Service supported by makers of pesticides, in association with one or more of the farm organisations. It may be one or more of them. The emphasis should be on the plant getting competent protection in time and not who gives it.
27. "Me too" more than "through me only" approach is found to help the mission in agriculture. We cannot yet say this customer oriented, cooperative spirit pervades all the relevant agencies and at various levels. Canada Agricultural Extension Services says: "Experience has shown that cooperation between federal and provincial workers in extension as well as in other fields of agriculture, makes for greater efficiency than does competition; and it is on the basis of mutual understanding rather than that of constitutional rights that extension and other agricultural programmes are carried out." British experience too confirms this observation.

28. From the farmer's point of view, it is a case of comparative costs. He weighs one proposition against the other on the basis of ultimate net benefit and not at-a-stage benefit. If the farmer misses one season, it is irretrievably lost not merely to himself but to the country to that extent. For this reason alone, the principle of alternative should prevail in every support and assistance the farmer is provided.
29. If the alternative agencies are not provided to him, the farmer makes his choice. One choice he makes is to remain where he ever did. The other choice he makes is to get what he wants 'somehow' and this 'somehow' approach erodes the fibre of the farmer and we should not let this happen. Hence our plea for the principle of alternatives wherever support to farming is concerned.
30. Using modern research findings necessarily means using other than conventional inputs, and for such inputs the farmer has to go out and get them and if they are not available, or if they are available but not in time, he will necessarily have to stick to methods which do not need these inputs. If then they continue to do the way they are doing, it is not because they have a resistance to change but because the things that go with the change are just not available or are certainly not available in time.

XV.

TIME AS A CRITICAL FACTOR IN ADOPTION

1. Now that the initiating end and the implementing end have been looked into in some detail, we need to have a quick look at the facilitating end, namely, administration.
2. The mission is often not accomplished by the user-end and the enthusiasm is lost by the initiating-end because the facilitating-end is not adequately facilitating.
3. One fact that is hardly recognised is that delays cost the mission high and sometimes the mission itself. Strangely, when the mission is not accomplished, the facilitating-end does not come for scrutiny but the other two ends do, though they find themselves helpless.
4. Probably in every country and more so in present day India, many things do not and cannot move without a piece of paper from a said authority.
5. The strategic factor then is the way and the tempo with which the related papers move.
6. When we examine the administrative processes on a time dimension, we get the impression that the

greatest single hindrance to achievement is the seeming indifference on the part of the paper movers to the ultimate mission and the resulting lack of timeliness.

7. As we move up and away from the delivery end, the sense of urgency becomes less and less and since the decision-makers are far away from the scene of action, the men at the delivery-end are not merely not understood but dubbed as alarmists.
8. Since departments are shy, we can refer only in a general way to the nature of delays here. Facts and figures we are able to quote only from the files of the farmers
9. In one state the fertiliser arrived at the godown of a local cooperative society and the Director of Agriculture issued orders for the issue. The farmers needed it in a week's time. They actually got it only after the season was over because the directive to release stock took many months to arrive at the cooperative store. And this scene is recreated year after year.

10. On 14th October 1966, a farmer wrote to the state government requesting assistance for the supply of a ture for the power tiller since one of the original tyres burst. This power tiller was incidentally supplied by the government with the assurance that "we have enough spares". On 18 May 1967 - 7 months later - the farmer received a regret letter.
11. Another case was quoted of how when a farmer approached the BDO for a sprayer, he was told that the sprayer was "under repair". The farmer persisted for 5 months and the BDO got annoyed with the farmer and not with himself for still keeping the sprayer "under repair".
12. At the centre, a promising proposal in respect of the production of a high yielding variety is moving within the same building for over two years now.
13. The problem of delays is a complex problem and it is partly due to attitudes, man's faith in man, personal skill and political reasons and we do not propose to go into the many causes of delay.
14. This is a big subject for study in itself. A few aspects deserve mention here, however:

One is that the facilitating aspect of administration has not permeated through the rank and file.

Secondly safety and security suggest that being right on paper is more important than being right in fact. We may fail the crop but we shall not fail the procedure.

Thirdly, there are too many 'post-office' type channels between the decision-maker and the execution agency whose major "contribution" seems to be to delay the work cycle.

Fourthly, In its anxiety to protect itself, a Government agency plays for safety and goes to a great length to assure that safety; and in the process, forget the purpose and the customer.

Fifthly, the modern tools of communication are not used to expedite matters.

And finally, the respect for the goal and therefore for the man at the firing line and the desire (apart function) to support him are missing.

15. The question will then arise: What could we do under the existing socio-economic values? As we examined some of the problem situations, a few possibilities occurred to us and we outline them below.

16. Where only one department is involved, the approach taken by one of the units in Maharashtra State Government can be taken, namely, that each section is made up of an officer and a steno-secretary and between themselves they dispose off the papers in record time.
17. In fact, compact offices with executive-secretary teams turn out better and faster work than the many-tier set-ups. Atleast in respect of newer offices, this pattern can be adopted.
18. Where execution point is a little away from the decision point, instructions may be sent to the execution point and 'for-information' copies for the intermediate channels.
19. Wherever there are executive committees, they can best be used to evolve a policy or provide a second opinion on a major decision. They need not meet monthly or quarterly. Within the policies and limitations set, the Chief Executive can discharge his responsibility for results. If the man for the position of the Chief Executive of the unit is well-chosen, this arrangement is found to bring about optimum performance. If we do not trust the

man, the answer is to replace him. The present executive committees often made up of "busy people" make the main purpose of the unit secondary. They can with advantage be replaced by advisory panels and the general body lay down the policies. This thought is particularly applicable to cooperatives.

20. Wherever a number of agencies are involved, an approach tried out successfully by the Economic Development Board of Singapore can be resorted to. Here at this Board, all that have a say on a proposal to start an industry meet one assigned day in a week and the understanding is that all stay on for the day and dispose of the case one way or the other. The man who puts up a proposal may wait in an ante-chamber. In a week's time, therefore, he knows whether he can go ahead or not. He also knows why not, if not.

21. This does require some preparation but since most of the relevant offices are situated at Delhi or the state capital, and since we are now well used to committee meetings, monthly inter-agency meetings can be held to dispose off repetitive type of papers, sitting round the table. The

decision makers or their deputies (with authorisation to exercise discretion) will be present.

22. Before the group adjourns, decisions can be dictated and concerned agencies can sign the paper on the spot. That way, the maximum delay in many cases would be a month, not more.
23. Another method that is likely to help reduce delay is to enable the decision-makers to be in live-touch with the execution end. The existing physical and psychological distance is hardly conducive to prompt and understanding action.
24. A further method is to work on a time targeted basis, working back from the delivery end and cutting out channels that do not contribute substantially.
25. One other tested method is decentralising the discretion to decide. Once the budget is agreed upon, once the boundaries are agreed upon, the unit-in-charge can be given the authority and the responsibility to use the resources and get results.
26. We get the impression that one cause of delay and one cause of ineffective decision is the

unscientific approach adopted by the officials concerned. The emphasis seems to be on 'who is right', not 'what is right'. Without listening to each other, the more powerful seems to lay it on the line. Nature, as it happens, reacts favourably to 'what is right' and dealing with agriculture is dealing with nature.

27. With all that we may do, unless and until we replace the inherited colonial administrative and financial procedures by procedures that go with a developmental economy, we cannot go places. In the colonial economy, the purpose of administration was to hold down expenditure under one pretext or another and the procedures were built that way. Results were considered secondary. In the developmental economy, results are primary and the purpose of administration is to help agencies spend productively. The needed changes, we learn, are well-known but they can be effected only by the highest authority. IF THE CABINET TAKES TIME OFF AND DOES JUST THIS IT WILL PROVE THE GREATEST SINGLE CONTRIBUTION TO BETTER ADMINISTRATION IN THE COUNTRY.

CONCLUSION

1. We have taken the delivery-end point of view.
We have taken the view that the yardstick should be knowledge in action, in this case, in the hands of the farmers. We may, perhaps add, effective action since only that would mean a high pay off.
2. In a sense, therefore, we have worked backwards.
We have taken the task force, the firing line, the farmers as the starting point.
3. We also took the view that the farmer should be accepted as he is and that we should not place conditional clauses like 'if only the farmer were like this, that or the other all will be well'.
The suggestion is not that efforts should not be made to help him in his education and development efforts. The suggestion is that we should not make it conditional.
4. We found that the average farmer is responsive to new knowledge, new techniques, new methods, new equipment and new tools. Relatively speaking, the farmer population is least resistant to change

Author E. I. P. A. New Delhi.
Title Evaluation of training
(NIPCCD courses in P
Issued 22
Borrower's
Signature

as far as farming is concerned, may not be organizational (like cooperative farming) but operationally (like methods of farming).

5. This being so, if we want top and peak performance from him, we need an administrative system that facilitates such performance. How does the present system facilitate such performance? What features of the present system deserve expansion, what discontinuance and what replacement - all with a view to facilitate top and peak performance?
6. We have attempted to answer this question in this study.
7. Details are important. Much more important seems to be a clear idea of the goal and the constant awareness of it all along the line and the resulting urge to help, to facilitate, to make it easy for the farmer to work hard.

APPENDIX I

Technological Improvement and
dissemination in Taiwan

CROP	(The year before the 1st Plan 1952) Kg.	End of the 3rd 4-year plan 1964 Kg.	Percentage change
Rice			
Brown Rice	1,998	2,937	147
Paddy equivalents	2,621	3,853	147
Sweet Potato	8,953	13,609	152
Wheat	1,139	2,097	184
Soybean	602	1,132	188
Peanut	741	1,148	155
Rapeseed	236	1,398	591
Sugar			
White Sugar	6,720	9,109	136
Brown "	2,375	5,802	244
Tea	305	502	170
Tobacco	1,621	2,277	140
Pineapple	10,731	21,635	202
Banana	6,819	14,813	217
Citrus	6,023	7,660	127
Citronella Oil	99	133	134
Jute	1,241	2,009	162
Flax	2,204	3,368	153
Mushroom	--	598	--
Aggregate			151

APPENDIX II

Estimates of production of selected agricultural
Commodities at the end of Fourth Plan.

Commodity	Unit	Base level 65-66	Additional production Fourth Plan	Estimates of produc- tion at the end of Four- th Plan	Percentage increase over the base level
Foodgrains	million tonnes	90.0	30.0	120.0	33
Sugarcane (gur)	"	11.0	2.5	13.5	23
Oilseeds	"	7.5	3.2	10.7	43
Cotton	million bales	6.3	2.3	8.6	37
Jute	"	6.2	2.8	9.0	45
Mesta	"	1.8	0.2	2.0	11
Pepper	000 tonnes	30.0	5.0	35.0	17
Cardamom	"	3.3	0.5	3.8	15
Ginger	"	22.0	5.0	27.0	23
Cashewnut	"	136.0	192.0	328.0	141
Tobacco	"	400	75	475	19
Coconut	million nuts	4713	400	5113	8
Arecanut	000 tonnes	101.9	8.5	110.4	8
Lac	000 tonnes	30	20	50	67

Source: Planning Commission.

Appendix: III

Funds for Research

To the question,

Does the research budget provide for adequate working tools and operating expenses? If not, how does it affect the work? Please illustrate by an example or two how the work has suffered.

One Research Institute answers:

The budget sanction is very meagre. It does not cover the day to day maintenance. Research Projects needing special equipments, therefore, suffer to the most. Even in the normal research projects allotment under contingency head is very much insufficient and this makes the proper implementation of the project difficult. Correspondence with the concerned Ministries of the Government for timely and adequate sanction is a regular feature and represents the most frustrating part of research administration. Cuts are imposed up to 50% and more on the average expenditure of the last several years.

Expenses on cultivation in an institute which produces nucleus seeds, etc. are treated on the same level as miscellaneous office expenditure and no effort is made to distinguish between valuable investment in farm production and routine expenditure in running an office. And in most of the cases, sanctions are obtained with arbitrarily imposed cuts after much delay. As an example -

The Mycology have eleven members of Research staff and three post-graduate students at present. For the 14 research personnel there are only four research microscopes, one phase contrast microscope (for special use only) available in the division. In 1964-65 and 1965-66 demands have been placed for purchase of four more microscopes (two research microscopes and two stereo microscopes of higher magnification) for use of the research workers. Due to paucity of funds the purchase could not be effected till today and the work had to be carried out under considerable difficulties and pressure. This is a typical example of research being conducted with frustration and difficulties by research staff.

At the same time demand for the purchase of two sterilisers was made due to the fact that the sterilisers available in the division had become very old and were giving constant trouble. It may also be mentioned that the increase in staff and work has necessitated the demand for purchase of additional sterilisers. But purchase could not be effected due to paucity of funds.

As demand was made to purchase the humidifiers for fitting up in the incubation chambers after artificial inoculation of host-plants. Foreign exchange was provided for the purchase of one humidifiers which was withdrawn subsequently. To carry out artificial inoculation under standard conditions, use of humidity in a chamber having controlled temperature is absolutely necessary. Considerable difficulties are being experienced to carry out this portion of work in the absence of incubation chamber with controlled temperature and humidity.

A pot-culture house with controlled humidity temperature was designed and put up for administrative approval, which was received in 1954. During the last 14 years, inspite of continuous pressure, due to frequent conflicting and contradicting decisions on release and availability of foreign exchange delay by C.P.W.D. delay in obtaining sanction, this work still remains unfinished.

Another Institute adds:

The research budget is inadequate. This has affected the output of work. The following examples will illustrate:

- i) For want of sufficient draft power, irrigation water, funds for labour-wages, etc. the field experimental work has had to be curtailed during the past few years. Some of the important problems, namely, experiments on water requirement, commercial tests on mechanization, development of seed-nursery techniques, etc. are being postponed. For want of a tube-well experiments on irrigation techniques have not been carried out so far.

- ii) For investigations on fertilizer uptake and minor element deficiencies, a radio-isotope laboratory has been set up. Similarly in Plant Physiology Section, the Physiologist had been trained for taking up investigation on plant hormones. For work on viruses, a glass-house has been constructed. In all these and other similar cases the proposed work is held up to a greater or lesser extent for want of funds. Many items, researches so far done have reached an advanced stage of application, but the application and commercial testing of the results is held up.

We have many problems which are of an urgent nature and in which the prospect of getting positive results is very high. For instance the Wilt Disease of sugarcane has been an urgent problem. Biological Control of certain insect-pests has immediate prospect of positive results. Much progress can be easily made to solve these problems, if the projects are sanctioned and funds provided.

A P P E N D I X IV

A note on ' Programmed Instruction'.

Programmed instruction is a new method of learning, based on research into the learning process itself. It is an extension of the facility for invention, of the desire to do things more and more efficiently. Programmed Instruction is an approach that has come out of the laboratory. Essentially, programmed instruction is an organised, systematic approach to teaching. It derives from experiments and studies in learning behaviour.

Programmed instruction tries to get the learner to participate actively in the learning process. It presents the information to be learned in small steps, each one designed to build on those preceding it and each one easily comprehended. The order of these bits of information is precisely formulated; it is the product of tests and retests which insure that the development is clear and remains clear to the learner. This precise design and the students involvement in the material help to reinforce learning and continuously motivate him to go on.

APPENDIX V

List of Films on Agriculture

As will be noticed, these films are of general,
not technical interest, to the farmer.

1. Bidi, Cheroot and Hookah Tobacco
2. Cotton
3. Groundnut
4. Wheat
5. Citrus Cultivation
6. Cashewnut
7. Hill Soil Conservation.
8. Mango
9. Our Regulated Markets
10. Pond Culture
11. Clean Milk
12. Rinderpest
13. Andrews Cotton 'The White Gold'
14. Hybrid Maize
15. Jute Cultivation
16. You Too Can Grow Grapes.
17. The Virginia Tobacco
18. For More Milk in the Hills
19. Beauty in Blossom.
20. Story of Lac, The
21. Pepper
22. Sons of the Soil (Farmers and National Emergency)
23. Apple Cultivation
24. Gobar Gas Plant
25. Banana Cultivation
26. Vegetable Growing
27. Reclamation of Saline and Alkali Soils.
28. Better Nutrition through Poultry.
29. "Potato - A Quick Growing Food".
30. Poultry Hazards
31. Grassland Management
32. Livestock Nutrition
33. Mixed Farming
34. Control of Tuberculosis in Cattle
35. The Living Cell
36. Kitchen Gardening
37. Useful Dry Farming Practices
38. Parasitic Infections in Farm Animals
39. Peaches and Plums
40. Paddy - high yielding
41. Hybrid Jowar
42. High yielding wheats
43. Hybrid Maize

APPENDIX VI

(A) FROM INTENSIVE AGRICULTURAL DISTRICT PROGRAMME:
SECOND REPORT (1960-65), EXPERT COMMITTEE ON
ASSESSMENT AND EVALUATION, MINISTRY OF F.A.C.D.
& C., APRIL 1966.

The second Report assessed the performance of various districts under the IADP in the light of the progress made, inter-alia, (i) making the administrative arrangements for introducing the programme; (ii) creating or strengthening the cooperative institutions in the fields of credit, supplies and marketing; (iii) developing effective methods of farm planning, demonstration trials; etc. for inducing the farmers to use improved practices; and (iv) availability of adequate inputs and adoption of improved practices. (409)

I. Administrative arrangements for
introducing the programme

1. The Committee discovered that although the organisational arrangements for educating and persuading the farmers to adopt improved practices and for developing an effective and dynamic institutional structure to provide the whole range of leadership, services and supplies required within a district to have a dynamic and increasingly productive agriculture, were not unsound in conception, their actual implementation had left much to be desired. In practice, there has been no continuity at the highest level inasmuch as there were four different administrative leaders in four years. The programme had, no doubt, a Project Director who continued throughout the period under reference. But this office lacked adequate supporting staff. The result was that top administration was unable to provide the requisite leadership at the field level and had to rely largely upon issuing directives from the headquarters to State Governments. (409)

At the district level, the Collector was expected to provide the necessary leadership. But in most of the States, the system of rotation of Collectors and the exigencies of administration led to their frequent transfer so that very few Collectors remained long enough in a district to get to know the district really well

Author H. A. P. A. New Delhi.

Title Evaluation of training
(NIPCCD courses in P

Issued

Borrower's
Signature

and understand fully the programme needs. The concept was that below the Collector, there would be a District Project Officer who should have adequate authority, resources and flexibility. With a few exceptions, the Project Officers were competent men, but the administrative procedures were such that they lacked adequate control over the budget and the staff, and in some cases even over operational matters, and often felt frustrated for want of adequate delegation of powers. (409)

The block staff is not sufficiently under the control of the District Project Officer. The latter need have substantial control over those assigned to the intensive effort, if he is to have a really intensive fast moving programme. Too often he finds the time and energy of some of the key block staff assigned to non-agricultural work, at a time when full time and intensive effort must go into the programme if it has to have the desired quality and speed. Not uncommonly he finds the State administration exerting a prior claim on the time of VLWs and BDOs and the agricultural programme suffering as a consequence. This has been true even though on paper VLWs are assigned full time to agricultural work. (410)

As regards the office of the District Collector, it is essential that the same person be kept in the district for four to five years so that he may know enough about the agricultural and cooperative needs of the district to do his job well. Where this cannot be done, the District Collector should be relieved of his responsibility for the IADP and full responsibility and authority should be given to the District Project Officer so that the programme can have the needed leadership. (411)

The pattern introduced in certain other countries of augmenting the technical staff at the block headquarters and using the latter as a training-cum-servicing centre for the farmers and replacing salaried VLWs by progressive farmers who are paid on a commission basis on the progress achieved, also deserves to be tried out in certain blocks. (411-12)

Author: H. D. P. A. New Delhi.

Title: Evaluation of training
(NIPCCD courses in P)

Issued

Borrower's
Signature

The District Project Officer should not only be permitted but also encouraged to try out such experiments with both procedure and staff-pattern as may be undertaken mainly by readjustment within the approved budget. (412)

II. Creating or strengthening Cooperative Institutions

(i) Cooperatives: Although the co-operatives have made some progress, yet the development has not been adequate to meet the requirements for a rapid increase in food production. There are several reasons for this situation, some within the cooperative sector and others outside. Strong, viable and effective local cooperatives cannot be built up quickly. Typically, the present service-cooperative is too small to become a really effective service institution. Prescribed margins, which are often too small to cover the cost of carrying and handling supplies, seriously restrict the possibility of a cooperative building up its financial strength and viability. The kind of educational programme needed to build local cooperative leadership and understanding among members and potential members has been generally lacking. Procedures are often cumbersome and result in irritating delays. Loans advanced are sometimes too little and too late. Rules and regulations under which the cooperatives operate lack flexibility and do not help promote local initiative and staff competence. (414)

The comprehensive action-programme formulated by the Union Ministry of CD & C and designed to improve the operation efficiency of the cooperative credit institutions and reorient their lending policies may be improved upon by supplementary arrangements for the provision of production credit, ensuring at the same time that such transitional arrangements do not hinder future cooperative development but as far as possible encourage it. It is from this perspective that the proposal to set up an Agricultural Credit Corporation, as a complementary and transitional system, in some of the States where cooperatives are lagging behind, has to be considered. (414-15)

(ii) Marketing and Processing:

Establishment of marketing societies so that the farmers may derive full benefit from their increased production has been rather slow. Some efforts have been made to bring credit and marketing together so that the repayment

Author	I.T.P.A. New Delhi.
Title	Evaluation of training (NIPCCD courses in P)
Issued	
Borrower's	

of the member's cooperative loan for financing his higher production plan can be paid for as he markets his crop through the local cooperative. The uncertainty that the farmer faces about selling his produce at a remunerative price and buying the inputs at a fair price can thus be substantially reduced. Some progress has, no doubt, been made in this direction but a large-scale effort of this kind must await the time when local cooperatives are strong enough for making such a system effective. (415)

III. Development of Effective Methods for Inducing the Farmers to use Improved Practices

(i) Farm planning as a tool of extension has, on the whole, helped in establishing effective contacts with the farmers and in assisting them to move, step by step, towards scientific farming. However, the concept of comprehensive farm planning, proved too complicated for the average farmer and hence unworkable in most areas in the initial period. As a result, some valuable time was lost. It was only when, in the light of this experience, a simple farm plan was substituted for the comprehensive farm plan, that the programme turned out to be more acceptable to farmers and gathered momentum. The farm planning technique, at the moment, suffers from lack of adequate research data on which to base extension recommendations in different areas for different crops, lack of adequate understanding of farm planning processes both by the field extension staff and the cultivators and the limited experience of credit institutions in extending production-oriented loans. (416)

(ii) Village, Block and District Planning:

Experience shows that if the tailor-made "package of improved practices" for individual farmers is not supplemented by a similar tailor-made "package of works" for the village as a whole, it is not possible to derive full benefit from the programme. Although a beginning has been made in this direction in the Stage II villages, sufficient emphasis has unfortunately not yet been put on the implementation of a "package of works" as a counterpart of the "package of practices" in most of the areas. There is often inadequate coordination, for instance, between irrigation and intensive cultivation programmes and progress is held up because even relatively small but essential works are not attended to in time or in a related manner. (417)

(iii) Field Demonstration:

Considerable importance has been attached under the IADP to field demonstration, mainly of a composite type, which constitutes a most effective tool for motivating farmers to adopt improved production practices. On the whole, these demonstrations have now come up to a fairly high standard from the technical stand-point and have invariably shown the superiority of the recommended practices over the traditional methods. Area-wide demonstrations where improved practices are demonstrated in action over fairly large compact areas have a visual effect far more impressive than that created by demonstrations laid out on small plots. Increasingly greater emphasis should, therefore, be put on laying out area-wide demonstrations, while planning farm demonstrations and field trials for advanced package of practices in the future programme of work. (417)

IV. Availability of Inputs

The IADP experience shows that the block seed farms, as part of the seed improvement programme, are not doing the job. They seem to need almost a complete administrative overhaul. Since the intensive districts have a qualified Seed Development Officer on staff, it may be desirable that the control of the block seed farms may be passed on to Project Officers. The State, no doubt, could and should continue to have charge of over all policy in relation to the total seed development effort. But the State is too distant to have effective charge of the local seed farms. One of the major weaknesses of these seed farms is the lack of managerial control including budgetary control within the district and this points to a clear need for improving their operations. (421)

The plant protection work recorded some progress in IADP areas pari passu with the increased use of fertilizers. Some of the factors which have stood against faster progress are: inadequacy of trained staff, lack of availability of power sprayers and insecticides for undertaking area-wide operations and reluctance on the part of the cultivators to take up prophylactic measures as a part of their farming operations. Inadequacy of research facilities has also proved a handicap. Increasing need has been felt for greater attention to the problem

of production and use of plant protection materials especially in view of the positive association that has been observed between increased use of fertilizers and increased incidence of crop-pests. (424)

Research and Operational Studies

The success of the LADP depends, to a very large extent, on the support which agricultural research can lend to the field programme in order to ensure that the recommendations made by the extension staff to the farmers are applicable in a most effective manner to local conditions and problems which usually show tremendous variation from farm to farm. Greater intensity of farming will require time-saving and expeditious operations involving the use of improved implements and mechanical devices. Thus, researches covering a number of fields become necessary if the programme has to move from a stagnant agriculture to a dynamic agriculture. (431)

Operational studies and feed-back of the results, with a view to ensuring continuous improvement of the programme, was an important element of the LADP concept. Here too, there was considerably delay in making the necessary arrangements. The utility of these studies, however, could be enhanced if due attention was given to the implementation of the findings by the staff engaged at the field level. It would be necessary to set up operational research units with adequate and trained personnel in the second set of districts as well. (431-32)

The Indian farmer, inspite of his illiteracy and poverty, is not unintelligent or unduly tradition-bound. His poverty, no doubt, makes him somewhat cautious in accepting an innovation which involves risk; but once he is convinced through extension effort, especially through demonstration, that a particular innovation is both useful and within his means, he is as prompt as farmers in any other part of the world to accept it. (432)

The small farmer can be no less progressive than the big farmer, especially where the adoption of improved practices is concerned and the sort of technological progress (especially in respect of chemical and biological, if not mechanical, innovations) which has been possible in the small farms of certain other countries can also be

Author: I.T.P.A. New Delhi.

Title: Evaluation of training
(NIPCCD courses in P)

Issued

Borrower's
Signature

achieved in the small farms of India provided the requisite pre-conditions for agricultural development are created. (433)

The administrative system is not adequate for the job and has to be geared to the needs of the programme. In fact, one of the most serious obstacles that the IADP has had to face is the archaic administrative system that obtains in the country. This system, based essentially on checks and balances, evolved in a different time and for a different purpose, has proved woefully inadequate for any operation, the aim of which is not to maintain the status quo but to change it. The IADP has thus been a square peg in a round hole. The main objective of the IADP is to accelerate the rate of growth by bringing about a basic change in the situation in which it operates. The main purpose of the administrative system that India has inherited is, on the other hand, to ensure security and hence allow only the minimum possible change. The IADP puts a premium on the technician who is the harbinger of change. The Indian administrative system gives primacy to the administrator whose main function is to lay down and administer the rules designed to ensure conformity. The basic idea of IADP is that it should be a tailor-made programme to suit the needs of a particular area which can be adjusted by the local authorities promptly and effectively, as and when the situation changes. The main concern of the Indian administrative system has been to lay down general patterns of conformity to which the areas must adjust rather than otherwise and leave the least possible discretion to the authorities lower down in the hierarchical structure. (433)

(B) FROM REPORT ON THE HIGH YIELDING VARIETIES
PROGRAMME: DIRECTORATE OF ECONOMICS &
STATISTICS, JUNE 1967.

At the instance of the All India Rural Credit Review Committee of the Reserve Bank of India a technical committee was set up by the Directorate of Economics and Statistics. The Technical Committee's principal aim was to get a general idea of the demand for credit for the High Yielding Varieties Programme and the role played by the cooperative institutions in producing necessary credit support. The report is based on case studies conducted in 8 districts the objectives of which were:

- a) Assessment of the response of farmers to the Programme and the factors having a bearing on such response;
- b) Assessment of the extent of the resulting demand for credit and inputs and how such demand was met;
- c) The role of institutional agencies in providing the services required i.e. extension, supplies and credit in the context of the programme; and
- d) Assessment of the extent of coordination among different agencies participating in the programme. (73)

Response of the Farmers

The response of farmers, which was not uniform from district to district and crop to crop, was governed by the available experience and extension in respect of the new varieties. It was later influenced by the adverse seasonal factors, inadequacies in implementation and the temptation to divert fertilizers to other crops. Some of the cultivators did not take up the new varieties because they wanted first to wait and see the experience of others or because of their apprehensions regarding the likely availability of chemical fertilisers or their harmful effect on the soil. It was also felt that increase in income was not sufficient to compensate for the additional costs involved in raising this crop. (80)

Demand for credit and inputs and
how such demand was met:

The principal factors governing the demand for credit for the HVV Programme are: (i) the extent of area covered; (ii) the size of the outlay depending on the extent of inputs used; and (iii) the extent of borrowing for financing the outlays. If the targets are unrealistic, as they were in 7 out of 8 districts surveyed, inflated estimates of credit requirements are prepared. If, in addition, the programme is spread thinly over the whole district instead of localising it in compact area blocks, the administration of the credit programme becomes difficult. (81)

The size of the outlay for the HVV programme depended on the extent of inputs used as against those recommended. The studies reveal that the participating cultivators were not agreeable to use the recommended doses of fertilizers. The level of use of fertilizers was broadly 50 per cent of the recommended dose and in the case of protection measures the adoption was lower still. The non-availability of the required quantity of fertilizers in some areas was also a factor influencing the size of the outlay of the participating cultivators. (81)

'Owned funds' accounted for a substantial proportion of the current farm expenditure on the High Yielding Varieties, ranging from 27 per cent in Cuttack to 90 per cent in Mahsana. The dependence on borrowings correspondingly was the largest in Cuttack followed by Kolaba and least in Mehsana. Among the sources of such borrowings co-operatives were the most important in all the districts except Aligarh where taccavi loans accounted for the bulk of such borrowings. (81)

Certain other general conditions have to be taken into account in assessing the demand for credit and inputs and deciding how such demand might be met. In the first season of the Kharif programme for 1966-67, the participating cultivators were discriminately selected from among the relatively bigger cultivators who had larger owned resources. In the coming years when the programme is extended to other areas and small and medium cultivators accept it, the demand for credit would be greater per acre than that for the participating cultivators in the sample. In this respect the estimate of additional outlay

for HVV Programme and in consequence the demand for credit for a part of that outlay, might lie between the additional outlay incurred by the participating cultivators and the additional outlay which might result if the prescribed scale of practices are adopted by the cultivators accepting the programme. (81-82)

Role of Institutional agencies and Coordination among the different agencies participating in the programme.

The Government departmental and extension agencies, co-operative institutions and Panchayat bodies were involved in the implementation of the HVV Programme. Action Committees were set up at different levels for bringing about coordination among the different agencies participating in the programme. The functional needs of different jobs and decisions, determined the success or failure of the HVV programme. (82)

In the earlier stages of planning the HVV programme in the selected areas, there appeared to be some differences of opinion about the targets considered as feasible by the district implementing authorities and those considered desirable by the Officers at the State level. The frequent revisions of targets and extension of the programme to a wide area, instead of confining it to selected compact area - blocks, were the first undesirable developments of the programme. The planning of targets and selection of areas and participants was followed by supply arrangements for the HVV seed. The studies indicated that the preparations made for seed supply by the implementing authorities were not adequate in some districts; either the seed was in short supply; was received late for sowing or was defective in quality. In one district the distribution arrangement encouraged non-utilisation and in another larger seed-rate than the recommended one was used when the seed was generally in short supply. However, the coverage or achievement of the programme was based on seed distributed. (82-83)

In the case of fertilizers, supply and credit problems got intertwined. And in the case of plant protection measures the problem was principally extension education in respect of the acceptance of these measures and of equipments for undertaking the measures on an area thinly spread all over the district. Among the districts

selected there were some where fertilizers were in short supply and others where it could not be used or was used on crops not covered by the HVV Programme. Fertilizers at the cultivators' level were also not received in time and late receipt perhaps encouraged their utilisation to other crops. Linking of fertilizer supply with the purchase of seed, supply of fertilizer only for the HVV crops and not for other crops, and compulsory contribution to share capital from out of the supply of fertilizer credit, were some issues which agitated the cultivators. In some districts the co-operatives could not supply as much fertilizers as were needed for the HVV programme and the cultivators purchased them against cash from wherever they could obtain them. (83)

It is not just sufficient to convince the cultivators about the high yields of new varieties which could compensate the additional cost involved, but it is necessary also to take into account the utility of the straw yielded by the crop, marketability of the produce and the problems of harvesting and threshing the HVV crop right in the middle of the monsoon season. (84)

(C) FROM FARM LEVEL RESEARCH IN AGRICULTURAL ECONOMICS IN DEVELOPING COUNTRIES

J. Wendell McKinsey
U.S. Agency for International Development,
New Delhi.

In regard to method or approach in farm level research, four suggestions are made:

1. In developing countries, much of the research on adaptation of new technology to farm businesses tends to be done by scientists in fields other than economics, such as analytical statistics, agronomy, or agricultural botany. Improvement could result from more attention to the economic relationships of new technology by researchers specially trained in economic research and with experience in and understanding of agricultural science and farm production.
2. The quality of the results from farm level research likely could be improved if it were organised as continuing long time programmes of farm management research, where the solution of one problem leads into the investigation of another, rather than as individual schemes with fixed time limits and little expectation of permanency on the part of the researcher. Making such research a permanent programme of agricultural colleges and universities is suggested.
3. Special programmes of training in research methods with emphasis on Farm Management for selected professional agricultural economists would be worthwhile investment in developing the fields as would periodic round table conferences of research workers in different States or different countries.
4. Farm level research will be most productive if oriented toward problems of farmers, and oriented toward improving their income.

The major effort in developing countries is to transform traditional agriculture into modern or scientific agriculture. This will result from the adoption of new technology/is profitable. Valid economic research is essential to guide farmers if the effort to introduce is to be successful.

For scientific developments by farmers. This farmers will do only if the adoption of the technology

Six suggestions are made as to the kind of research at the farm level that is needed in India as an example of the needs of a developing country:

1. The development of reliable production coefficients. It is further suggested that cooperation between economics researchers and the scientists in production fields could yield significant results toward this goal.
2. Surveys of existing conditions will be useful to orient researchers, identify high priority problems and identify resources available for applying results of research in a meaningful way.
3. Even though the over all social goal of research is to increase production, the individual farmer adopts new techniques only if they prove profitable. Research on effect of a new practice on income is just as important to sustained development as is the research on the effect of that practice on output.
4. Particularly during the period of transformation of traditional agriculture, financial risks of the individual farmer are increased. Meaningful research on ways to elevate the degree of certainty of increased returns from new technology would speed adoption of scientific methods.
5. Scientific farming increases the number and frequency of decisions and increases the opportunities for increased production and income. Farm planning becomes crucial. Techniques of planning and way of helping farmers to become better planners themselves deserve major attention in the research programme.
6. Development of "plans of adoption" of new technology, through research, that will guide leaders and farmers alike into programmes that will yield return of borrowed capital in optimum time and allow farmers stability or improvement in family living is essential if adoption of new technology is to proceed at a rapid and steady rate.

(D) FROM THE ADOPTION OF AGRICULTURAL PRACTICES
IN TWO VILLAGES OF MADHYA PRADESH

Linwood L. Hodgdon
and
Harpal Singh

The study was undertaken to obtain firmer knowledge and understanding of factors which operate in villages to facilitate or retard adoption of recommended agricultural practices by cultivators. The following are the main findings of the study:

Adoption of a new farm practice requires that the cultivator be made aware of the practice, become interested in it, evaluate it, try it out, and then take the step of adoption. At least the first three of these steps depend upon the flow of information to the cultivator; without this flow, adoption cannot occur. (6)

Development agencies seeking to advance adoption of improved practices must provide certain essentials if their suggestions are to gain wide acceptance. These essentials include: (a) An atmosphere of mutual respect and trust between "change agents" and the farmers; (b) reliance on sound and tested extension principles and methods to strengthen the educational process and broaden cultivator goodwill and support; (c) emphasis on practices that are highly visible and profitable; (d) focus upon the felt needs, feelings, and aspirations of farmers; (e) provision of information to adequately explain the desired practices and motivate farmers to action; and (f) development of local leaders and organizations through which the villages' human resources can be effectively mobilized. (10)

The cultivators stated they were not adequately informed of the proper use, purpose, or effectiveness of different supplies. This aspect of the adoption situation appeared repeatedly and accounted for considerable dissatisfaction in the use of nearly all supplies. Their replies indicated a serious lack of extension orientation to the needs, interests, and feelings

of the farmers. Adequate extension measures and attention to details were not always present, with the result that some farmers who took pesticides and dhaincha never used them - because they didn't want to or didn't know how.

The situation of fertilizer in these villages, as well as most of the other supplies, involves a fundamental issue. This is the issue of how Government's efforts to bring new agricultural practices to cultivators from the 'outside' can be fitted to the culture and the needs of farmers in the villages. This "marriage", like others, must be based on mutual respect and a willingness to understand the feelings and aspirations of the other party.

The farmers of these two areas indicated that their role in the extension programme was that of recipients of orders, credit, and supplies for carrying out work that had been pre-determined elsewhere. Little evidence was seen of participation by the villagers in deciding upon practices to be emphasized or upon the services to be provided. In general, the extension programme in these villages reflected primarily the Government's concern for goals and the Government's methods for attaining them.

The farmers of these villages, as indicated by the 60 interviews: (1) Have had little or no voice in the formulation of agricultural policy or programmes at any level (even for the primary cooperative society); (2) have little opportunity to express their felt needs with respect to operations; and (3) have been somewhat helpless participants in agricultural improvement. The organizational patterns and institutional arrangements through which the Government and the farmers might join in an effective partnership for rural and agricultural development are hampered by an almost exclusive attention for official plans, policies, objectives, and directives.

Cultivators' responses indicated that the official framework affecting these villages does not encourage two-way flow of information between officials, technicians, and the villagers; that, as a result, farmers' problems may fail to reach agricultural specialists for solution; that Extension Specialists and VLW's become preoccupied with carrying out directives; that the Government agricultural improvement work is deprived of the many benefits which are known to derive from discussion of village needs in an atmosphere of mutual respect and confidence; and that more importantly, improvement activities fail to tap the reservoirs of local initiative, support, judgement, and skill. All of these factors restrict the desire and ability of farmers to adopt recommended practices and retard the development of agriculture.

All extension work has to focus upon this complex of factors: its job is to lead cultivators away from false notions that this or that measure, by itself, can solve their production difficulties as if by magic.

Apparently, many farmers of these two villages need help in understanding the inter-relationships of fertilizer and other factors. Their all-too-general view is that chemical fertilizer hasn't increased their production as much as they hoped and that whether it should be used at all is a matter open to debate. This is probably the penalty extension work must pay for not adequately explaining the dovetailing relationships of the various key factors of production. (51-52)

(E) FROM REPORT ON INDIA'S FOOD CRISIS AND
STEPS TO MEET IT: THE AGRICULTURAL PRO-
DUCTION TEAM SPONSORED BY THE FORD FOU-
NDATION, APRIL 1959.

The individual cultivator is the key person in any programme to increase food production, but comparatively little is known about him and the basis for his decisions on what he will produce and how. He must be persuaded to change his present pattern of production if food targets are to be achieved. Research can reveal comparative costs and returns from such practices, and combinations of practices such as fertilizer, improved seed, mechanized equipment, controlled grazing, soil and water conservation, marketing cooperatives, and the like. (101)

In so far as possible, the actual research in farm management should be centred at the agricultural colleges. Those who are teaching agricultural economics would then have an opportunity to study actual farm and village problems, and to use the results in their teaching as well as making them available for programme guidance. A close working relationship should be maintained with the extension farm management specialists stationed at block headquarters. (102)

To assure that research is making its proper contribution to food production, an inventory of agricultural research should be made to determine what information may be lacking, what research gaps need to be filled, and what new projects should be undertaken. (104)

We would urge that India give greater consideration to team approaches in both planning and implementing research. Most (not all) agricultural problems are complex and can often be solved most effectively by the combined efforts of scientists from two or more disciplines in less time and with less expenditure of effort and money. (104)

All research activities, research findings and technical knowledge must be related to the cultivators, who in the final analysis must apply the results of research to their own farming operations. (104-5)

A substantial number of the problems on which research workers in agriculture spend their time should come from and be identified in the village and by the cultivators.

Research activities should in large part be framed by the needs and difficulties of the cultivators. If this is done, research findings can more readily be put into village practice. (105)

There is need for more precise statements of goals and procedures for the various programmes and sub-phases of programmes. If programme action people are to determine programme success and if research people are going to measure goal accomplishment more precisely, the goals, both intermediate and long-term, will have to be explicitly stated so that empirical measurement is possible. (244)

The programme research and evaluation people should be brought into the planning process of action programmes at an early stage. They should not play a major role in planning the programme, unless it is planned that there will be information "feed-back" as the programme develops. However, if they are involved in the planning process, they will have better understanding of the objectives of the programme and of the means being used to attain these objectives. This understanding should enable them to do a better research job. (244)

There should be increased efforts placed on "process" studies. There have been some "before" and "after" studies made to measure the change brought about by specific programmes. However, there needs to be more emphasis placed on the intervening process of change between the "before" and "after" studies, that is, on what are called "process" studies....Ideally, "process" studies should be made while the programme itself is in process, for instance, with the participant-observer technique. In cases where this is not feasible, many valuable insights can be gained from post-fact reconstruction studies. (245)

There should be more effective use made of the case study method. Case studies are valuable for detailed analysis of a limited number of cases of particular problems, programmes or individuals and provide much valuable information that could be used in planning future training and action programmes and in making administrative decisions. (245)

Research and action people should be aware of the problem of "feedback" in experimental research. In some cases it may be desirable to "feed" research data gathered in an ongoing programme to the action people as a basis for making decisions as the programme progresses. (246)

(F) FROM REPORT OF THE SECOND JOINT INDO-AMERICAN
TEAM ON AGRICULTURAL EDUCATION, RESEARCH AND
EXTENSION: INDIAN COUNCIL OF AGRICULTURAL RE-
SEARCH, JULY 1960.

The team identified the following as the basic principles of agricultural research: (29-30)

1. All agricultural research should be geared to India's major problem of increased agricultural production from both short and long-range aspects. An integral part of this principle is the need for increasing the efficiency of agricultural production.
2. Problems interfering with maximum food production that can be solved through research must be properly identified and given priorities for investigation and solution.
3. Before launching a major research programme on a particular problem, provision should be made for studying all facets of the problem as it exists at the cultivator's level. Research on various aspects of the major problem or subsidiary problems may be assigned to scientists in various disciplines and organizations; however, the research efforts must be so planned that all segments of the major problem are considered and that all research efforts are coordinated.
4. All agricultural research must be coordinated and integrated to provide maximum progress towards solution of problems and elimination of duplication. Needless repetition of research already conducted in India or other countries should be avoided.
5. Agricultural research should be designed and conducted in such a manner that answers to the cultivators' problems are forthcoming. Emphasis should be given to applied research that will permit putting into practice known basic principles. Basic research should, for the present, be restricted to those problems where applied research is hampered by inadequate knowledge of fundamentals.

6. Research results must be of unquestionable accuracy. All critical phases in the conduct of a research experiment should be under the direct observation of a research specialist adequately trained to understand the objectives of the experiment and to recognize bias introduced through faulty techniques. The tendency of research officers to delegate the collection of field data and observations to incompetent subordinate staff cannot be condoned.
7. Research specialists should be utilised to maximum advantage. They should devote major attention to research and not be handicapped with administrative duties and details. Personnel evaluation and promotion should largely be based on their research competence and productivity.
8. Provision should be made for an adequate training programme to provide increasing numbers of research personnel with high technical competence. The education and research components of the agricultural college comprise an inseparable team in attaining this objective. Training of research scientists can be accomplished best by scientists participating jointly in education and research.
9. The total agricultural research programme in India is inadequate to cope with the many and varied problems relating to increasing production. Additional specialists and facilities are needed. This need will exist even after the current research programme is raised to a high state of effectiveness.
10. Over-centralisation of agricultural research should be avoided. Effective decentralisation can best be achieved by strengthening the State research programmes through expanded Central and State assistance.

THE TEAM RECOMMENDED: (66-68)

1. The overall agricultural research programme in India should be substantially enlarged in specialists and facilities to cope with India's enormous problem of increased agricultural production.

2. Major problems should determine India's agricultural research policy. To identify these problems, to establish priorities, and to determine means of implementing a research programme geared to solve these problems, an Agricultural Research Policy Council should be formed. This Council should be comprised of high level agricultural technical officers and serve as a standing Advisory Committee to the Governing Body of the Indian Council of Agricultural Research. With the establishment of this high level body the Board of Research should be abolished.
3. Coordination of all agricultural research programmes should be strengthened. It is recommended that the Indian Council of Agricultural Research, founded as the coordinating body, should effectively assume this role. Necessary organisational changes should be adopted some of which are listed below.
4. It is recommended that all the Central Research Institutes and all the Commodity Committees be brought under the full technical and administrative control of the I.C.A.R.
5. Strengthening the technical staff of the Indian Council of Agricultural Research should be given high priority. Effective coordination can be provided by this body only through the establishment of staff specialist posts in the major research fields.
6. The designation of project coordinators for appropriately grouped segments of research should be extended. Lines of responsibility should be clarified.
7. The Indian Council of Agricultural Research should sponsor only major projects of regional or national significance and cross-commodity research projects. Local research should be the responsibility of the States.
8. To ensure the States' capability to assume responsibility for research, it is recommended that the Government of India make available to the Indian Council of Agricultural Research a substantial allotment of funds in the Third Five-Year Plan to be expended on the basis of a careful assessment of the needs of each State by the Agricultural Research Policy Council.

9. All of the agricultural research programmes within a State should be coordinated by setting up strong State Research Boards. The responsibility for co-ordination of research at the State level should be assigned to a Joint Director of Agriculture (Research) who should be the Principal of the dominant Government Agricultural College.
10. Agro-climatic areas should be demarcated and one major regional station established in each area. Each of these stations should function under the central co-ordinating authority of the State in which it is located. In the interests of minimizing dispersal of facilities and personnel whenever practicable, branch, State and Central stations in the area should be combined with the regional stations.
11. All branch and regional stations of Central Research Institutes and Commodity Committees should be combined and fully integrated with State stations wherever practicable. All personnel of these agencies at such stations should be under the administrative control of the State, with selection, promotion and technical control retained by the parent agency.
12. Gaps in coverage of agricultural research by current programmes should be given particular scrutiny with a view to bridging them. In certain deficient fields, such as fundamental research in soil and water conservation, horticulture and plantation crops, and others, consideration should be given to strengthening research by the establishment of centrally financed, well-equipped research institutes.
13. In the major food grain crop areas for which research resources are inadequate, such as rice, wheat and pulses, additional funds should be appropriated and earmarked for intensification of research on these crops, thereby releasing current resources of Indian Council of Agricultural Research for other crops and fields which have not received adequate attention.
14. In the interest of improving the quality of agricultural research, measures should be adopted to increase the incentives, morale and scientific integrity of agricultural research scientists. Permanency of posts,

promotions on the basis of research competence, incentive awards and recognitions, salary scales comparable with other services, and other pertinent factors should be given due consideration and corrective measures implemented.

15. In the interest of providing a basis for the improvement of mutual understanding and harmonious working relations between State and Centre personnel at the regional research centres and sub-stations of the Central Research Institutes, it is recommended that appropriate Memoranda of Understanding, defining specific responsibilities and relationships of the participating agencies and personnel, be developed by the cooperating agencies. Provisions of such memoranda should be made known to all participating scientists.
16. More effective liaison should be developed between the I.C.A.I. and the Botanical and Zoological Surveys of India and other organisations whose work has a bearing on agricultural research.
17. More effective coordination should be brought about between Irrigation and Agriculture Departments both in the States and Centre in order to make irrigation and drainage research more fruitful and to utilise the irrigation potentials to the maximum.
18. Information collected in the I.C.A.R., Central Project Files should be made available freely to all research workers throughout India.

(G) FROM REPORT OF THE AGRICULTURAL RESEARCH
REVIEW TEAM, I.C.A.R., NEW DELHI, MARCH 19, 1964

The functions, organization and working of institutions engaged in agricultural research, extension, and agricultural education were earlier reviewed by the two joint Indo-American Teams in 1954 and 1959. For a further exploration of the details of research organization, the Government of India on October 31, 1963, appointed another Agricultural Research Review Team. The terms of reference of the Team, *inter alia*, included: To appraise the merits of proposals of the First and Second Indo-American Teams with respect to changes in the organization and administration of agricultural research programmes of the Centre and the States and the problems encountered or likely to be faced in implementing these proposals and suggest steps required to orient research problems in the field, particularly, in the State research institutions and to ensure an adequate contact with the agricultural extension worker to bring about two-way traffic between the farmer and the research institution. (Appendix I to the report)

One of the biggest problems of agricultural research in India is that of coordination, by which we mean the elimination of wasteful overlap of research effort and the infusion of a sense of common purpose into all branches of agricultural research. It is greatly intensified, however, by the multiplicity of channels of responsibility and control and by the inadequacy of the coordinating powers at the disposal of I.C.A.R. The first requirement for coordination is obviously information in some central office about what is going on all over the country. This, so far as we can determine, is lacking. This is useful work, but at the present rate of progress it cannot meet the need for a complete index of agricultural research projects, kept up to date to show all the work that is currently active. (14-15)

The Central coordinating body at present is the Indian Council of Agricultural Research, which is a registered society functioning as a scientific Association composed of States and Centre. The First Indo-American Team, after examining the activities and responsibilities of ICAR, thought that its leadership in coordinating agricultural research was ineffective, and visualised "the development of the Council into a well rounded staff of specialists in the major problem fields to serve as a senior Council of Special consultants or advisers under

the Vice President of the Council". They also recommended a closer working relationship between ICAR and the Central Research Institutes, in which the latter would function as the operating wings of the Council. The Second Indo-American Team, realizing the prevalent diversity of research responsibilities, reiterated the recommendations of the First Team in even stronger terms. They recommended that, in the interest of consolidating the central agricultural research programme and assuring adequate coordination, all central research institutes and Commodity Committees should be brought under the full technical and administrative control of the I.C.A.R. (29-31)

We now go a step further, and recommend that the Indian Council of Agricultural Research as now constituted be abolished and that a new council with additional duties and responsibilities be authorized by the Government of India. The new organization may be called the Council for Agricultural and Food Research (C.A.F.R.). The C.A.F.R. should be headed by an experienced and eminent career scientist, who should be given the title of Director General of Agricultural and Food Research and the status of Secretary to Government to fulfill, among others, the following functions, viz. assume full technical and administrative control of all Central Agricultural Research Institutes, all existing Commodity Committees including the Central Sugarcane Committee, and certain other research organizations and act as a clearing house for information and arrange for the prompt publication of the results of research. (31-33)

We endorse the recommendation of the Second Indo-American Team, that State Research Boards should be established (where they do not already exist) to assess the agricultural problems of the States and the effectiveness of the current research programme to solve them. We agree also that such bodies should have representation from all segments of research relating to agriculture, including irrigation. They should not be composed entirely of government officials, but should enlist the best scientific talent in the States. (53)

The Team was of the opinion that implementation of some or all of the following suggestions would do much to focus the attention of the research conducive to conveying information from the laboratories to the extension officers and subsequently to the field:

- (i) Agricultural extension personnel should be administratively responsible to the agricultural administrative arm of state government rather than, as now, subservient to two masters, i.e., Agriculture Department and Development Department.
- (ii) Extension officers responsible for advising in specialist subjects should, whenever possible, be located within or adjacent to well recognized agricultural research institute or station. If at all possible their offices should be in close proximity to the research personnel of their particular discipline or area of interest.
- (iii) A way should be found to get more of the research staff intimately acquainted with problems of the cultivator. They must spend some time in the field, talking with cultivators and observing problems at close range. Certainly this will require some travel budget. Preferably, the research officer should make his contacts in association with the appropriate extension specialist.
- (iv) The field days now held for cultivators at some research and teaching institutions should, in spite of difficulties, be encouraged and extended. The increased personal contact between researcher and cultivator would be mutually advantageous.
- (v) Publicity should be strengthened and expanded by adding to extension staffs more officers with editorial duties. These officers should have the capability of putting the results of research into words or through other media

most readily understood by the cultivator. They must be specialists in the area of communication, translating highly scientific laboratory data into easily understood action programmes.

- (vi) To expect the Village Level Worker to be competent in all the duties now assigned to him is unrealistic. The report of the working group on Inter-Departmental and Institutional Coordination for Agriculture Production (1963) recommended that the Village Level worker devote 100% of his time to agricultural problems and thus be relieved of many service activities. We strongly support this recommendation and urge implementation at the earliest possible date. (60-62)

(H) FROM REPORT ON PROBLEMS OF COORDINATION
IN AGRICULTURAL PROGRAMMES: PROGRAMME
EVALUATION ORGANISATION, 1965.

The report, with some elements of a pilot nature and undertaken through composite case study method based on personal observation and investigation, viewed coordination in the perspective of the totality of jobs, decisions, activities and events that provide the full picture of implementation of agricultural programmes. In this functional approach, coordinated implementation of an agricultural programme, properly conceived and planned, involves the working out of a detailed programme of action, and the systematic pursuit of this, jointly as well as severally by the different agencies concerned with it.

Mainly for the sake of convenient analysis, the schemes covered by the study were grouped as follows: (i) work schemes e.g. minor irrigation, soil conservation (ii) supply schemes e.g. fertilizers, improved seeds, etc. (iii) credit schemes e.g. taccavi, cooperative loans, etc. and (iv) extension schemes e.g. demonstrations, compost, etc.

The main findings and recommendations of the report are summarised below under these broad heads:

Work Schemes: There has to be a proper assessment of areas requiring different land improvement works such as soil conservation, land reclamation and minor irrigation. The individual resources of the cultivators, the community resources in terms of voluntary labour and State resources in terms of loans, grants and subsidies, as well as technical know-how, are to be estimated in advance so as to match the requirements and potentialities of each local area. Problems of coordination in this sphere arise mainly because of differential rates of the individuals and the community in discounting the future increments in income, the procedural difficulties impeding the supply of credit, the non-availability of essential construction material and equipment, and lastly, the involvement of more than one agency in the execution of the land improvement or work schemes. Even for a high priority programme like minor irrigation, a satisfactory unified approach is yet to be evolved; and a unified approach covering all land improvement schemes has yet to become a reality in planning (83-84)

Fertilizer Programme: In the first three years of the Third Five-Year Plan, shortfall in achievement in the target was often sought to be made up by frequent upward revision of the targets. But unless targets are worked out rationally, carefully and coordinatedly, the succeeding stages of the programme get started on a wrong basis. The high target fixed for the Fourth Plan would precipitate all the problems thrown up by the case studies, viz., the arrangement of timely dispatch of fertilizers to consuming centres, their prompt distribution to cultivators and provision of credit. The cooperative organisations will have to develop in all dimensions if they are to successfully discharge the heavy responsibility. It will also have to be ensured that the loan given in the form of fertilizers is availed of by the cultivators and used by them on their farms. Similarly, insistence on buying unpopular fertilizers along with popular ones should have to be judiciously used so that the objective is not defeated by malpractices. (82-83)

Seed Programme: The reports on the case studies indicate that unless matters improve substantially, serious problems are likely to be faced in ensuring the supply of adequate quantity of seed for different stages of multiplication, the cooperation of non-official and institutional agencies and the procurement of seed, seed certification, and seed testing etc. The case studies highlight the fact that the programme gets diluted at three stages: at the stage of the supply of breeder's stock to the seed farms, utilisation of the area of the seed farms for production of foundation seed which again is dependant on the development of irrigation and other facilities on the farm land, and at the stage of certification, procurement, testing and storing of seed. In these spheres, efficient organisation, coordinated arrangements, quicker methods and stricter enforcement of quality control are urgently called for, to ensure success of the programme. A scope for improvement exists in areas of both lateral and vertical coordination. (82)

Credit Schemes: The case studies indicate that no single agency - panchayat samiti, cooperative society or the department concerned - seems to be effective in meeting the various types of credit needed by the cultivators for different programmes. The emergence of the panchayat samiti in the matter of distribution of loan funds of

different departments has not done away with either the inefficient utilisation of credit or delay in its sanctioning. The distribution of credit solely through the co-operative agency has not emerged on an extensive scale. In the Fourth Plan, with a greater requirement of credit for agricultural production, the cooperative structure would show more strains if the responsibility of disbursing credit for agricultural production is to be discharged by them. In the districts where multiple agencies operate in the distribution of credit to cultivators, there is no evidence to show that a working plan is drawn up for co-ordinating the loan activities of different agencies. (83)

Agricultural extension: Agricultural demonstrations on cultivators' farms have become the most important of the agricultural extension programmes. Except in the I.A.D.P. districts, demonstrations are planned and executed more with an eye on recording the achievement of targets by the functionaries, than on the basis of an analysis of their promotional and educational value. The targets are generally set too high for each V.L.W.; the supervision of them is inadequate; the selection of plots is many times defective; the practices are half-heartedly adopted and they are not seen as demonstrations by many cultivators. (84)

In planning agricultural programmes, the gestation period required for the extension of new ideas and practices, leading to their eventual acceptance, has to be kept in mind. This gestation period may get prolonged because of inadequate technical competence of extension workers and inadequate supervision and guidance from higher officers and specialists in different branches of agriculture. The extension programme and its intensity has to keep pace with the technological improvements in agriculture. (84)

The case study reports give an impression that in respect of the number of agricultural demonstrations, their technical supervision and the arrangement of supplies needed for conducting them, there is much to be desired in what is being done under the agricultural demonstration programme. Perhaps the weakest aspect of demonstrations is the analysis of their results and the subsequent follow-up work. (81)

(I) FROM THE REPORT OF THE PROCEEDINGS OF
5TH CENTRAL KEY PERSONNEL CONFERENCE
(HELD ON DEC. 15-18, 1965)

NEED AND SUGGESTIONS FOR KEEPING LIAISON
BETWEEN RESEARCH AND FARMERS' PROBLEMS.

The conference, inter alia, considered the arrangements in vogue in the States for linking research with the problems of the farmers. These arrangements provide opportunity for research specialists and extension officers to get together once or twice a year to review the results of research and the field problems but do not always ensure communication between the farmers and research institutions. The conference recommends that:-

1. There is need for adequate contact between the farmers and the research workers in order to ensure that research is problem-oriented and to provide answers to specific field problems. The practice obtaining in the States of inviting farmers to participate in field days at suitable research stations need to be supported further by provision of hostel facilities to farmers to enable them to stay over-night and spend more time with the research and extension workers at the research stations. A suitable arrangement should be developed in each State to ensure communication between farmers and research institutions. The arrangements developed in Bihar and Punjab appear to be satisfactory. In Bihar the Regional Research Advisory Committees meet twice a year. These Committees bring together research specialists, extension subject matter specialists, teachers of agriculture as well as the farmers. Field problems to which answers cannot be provided by these committees are referred to different Working Parties of the State Research Programme Committee. The Working Parties represent different disciplines as teachers and they consider the problems and programme of research.

The recommendations are then referred to the States Research Programme Committee. The States may examine the existing arrangement to link research with the problems of the farmers and introduce improvements whenever necessary. In this connection the arrangement developed by the Punjab Agricultural University deserves adoption by other States wherever Agricultural Universities have been established. The Punjab Agricultural University has placed in each district a team of four subject matter Extension Specialists who work in close collaboration with the officers of the Agriculture Department to disseminate and demonstrate the package of practices and other improved farming techniques and tools developed and recommended by the specialists of the University. The district level extension specialists receive training and continuous guidance from the University headquarters team of subject matter specialists operating under the overall guidance and supervisory control of Director of Extension Education of the University. These headquarters Extension Specialists maintain close liaison with the Professors and research specialists of their respective subjects, being a part of the University departments dealing with the subjects. This team of extension specialists in the University besides training the University staff placed in the district, also provides training to the officers of the Agriculture Department and the Agriculture Extension Officers from the various blocks. Besides, they convey the problems of the farmers communicated by the district level Extension Specialists, to the research specialists of the appropriate departments of the University for solution. They also attend the district training camps of the farmers in which their problems are examined and those needing research or intensification of extension effort are brought to the notice of their research counterparts and the Director of Extension Education at the University.

2. It may even be necessary to establish new research or testing stations in particular districts to provide the needed research support to agriculture going through rapid change under the impact of the IADP and IAA Programmes. Appropriate facilities to provide the needed research support should be developed.
3. It is desirable that the research specialists (whether operating under the Department of Agriculture or under the Agricultural University) representing different disciplines should be invited to the programme planning session.
4. The research specialists should, besides helping the IADP staff in planning the programme, advise them in effective demonstration of the practices which they recommend for achieving high levels of yield. In order to prevent any confusion that may arise from dual control there should be a single line of command under the over all supervisory control of the project Officer.
5. The programme of agricultural implements needs adequate extension support. There should be carefully planned programme of demonstration of improved implements through properly trained and qualified personnel. The demonstrations should be established in consultation with the farmers.
6. Soil-testing work should be extensively undertaken through the soil testing laboratories provided in the IADP and the IAA districts. Their results should be utilised to refine the existing fertilizer recommendations made to the cultivators. The communication between the soil testing staff and the farmers should also be improved so that the fertilizer recommendations, based on soil test results, are extended to all the farmers from whose fields samples have been taken.

7. The focus of our programme has to be the Indian farmer. We can give him the necessary inputs - and we should give these by mobilising all our resources, both internal and external. But unless those who give him the technical service and sustain the inputs programme by their extension enthruse him to come forward and apply the new technology, Indian agriculture will not move forward. (60)

While discussing the need of information material, the 5th Central Conference of Key Personnel felt that there was great need for the production of instructional films on subjects having direct bearing on the Intensive Agricultural Programmes such as Package of Practices for selected crops and related items.

The need of a van for purposes of publicity and for showing films in the Intensive Agricultural Area Districts was greatly stressed and it was recommended that it should be provided to each of the I.A.A. Districts.

The Conference was also informed about the service organisation in the Information Unit of the Directorate of Extension which could be utilised by the I.A.D.P. Districts for technical guidance.

The Information Units at the State Level need to be strengthened so that they could meet the growing needs of providing information material which is in scarce supply at present.

In view of the programme for introduction of high-yielding varieties to be taken up, it was emphasised that suitable films on "Package of practices" recommended for the cultivation of these varieties should be produced and shown in the selected areas. The Directorate of Extension in the Ministry of Food and Agriculture, Government of India will initiate necessary action in the matter immediately.

In view of the importance of relaying information through Radio, it was stressed that the State Governments should expeditiously strengthen the State Information Units on the suggested pattern.

The Conference appreciated the importance given by the Ministry of Information and Broadcasting in constituting Agricultural Broadcasting Units at ten Radio Stations of the All India Radio. It strongly recommended that this pattern be extended to all other stations of the All India Radio so that the Radio could give a strong and continuous information support to the Intensive Cultivation Schemes all over the country. (21)

Author **I.T.P.A. New Delhi.**

Title **Evaluation of training
(NIPGD courses in P)**

Issued

Borrower's
Signature

CROP INSURANCE

In a report prepared by the Working Party appointed by the Food and Agriculture Organisation in its session held in Bangkok in 1956, the advantages and benefits to be derived from crop insurance have been neatly listed as follows:

"First, it cushions the shock of disastrous crop loss by assuring farmers of protection against various natural hazards beyond their control.

"Second, crop insurance helps to ensure a considerable measure of security in farm income and thus contributes to greater stability in general economic conditions. It spreads the crop losses over space and time; that is, losses suffered by farmers in particular localities are borne by many scattered over wide areas, and reserves accumulated in good years are used to meet losses in bad years. It not only protects their incomes but their investments in the crops as well.

"Third, crop insurance will improve the position of farmers in relation to agricultural credit. One of the major causes of indebtedness of farmers in underdeveloped countries is the distress caused by frequent crop failures. Crop insurance, by guaranteeing a protecting against such failures, would go a long way to free the farmers from increasing debts.

"Also by improving the economic position of the farmers it would considerably strengthen the financial position of the agricultural cooperative credit institutions. Currently one of the greatest weaknesses of these institutions, in many underdeveloped countries is that the farmer-borrowers are unable to repay their debts regularly, which often results in considerable accumulation of overdues and, as sometimes they are not able to repay, the loans have to be written off either wholly or partially.

"Fourth, crop insurance would give the farmers greater confidence in venturing upon the adoption of new and improved farming practices and in making greater investments in agriculture for improving crop yield and increasing agricultural production.

"Fifth, crop insurance by encouraging self-help and mutual aid would promote an attitude amongst farmers favourable to co-operative efforts generally.

"Sixth, the Government would, to a certain extent, be relieved of the present irregular financial burden of providing relief and distress loans to farmers in case of large-scale crop losses.

"Finally, crop insurance will help maintain the dignity of farmers as they will not have to depend on "handouts" from the Government in case of crop failure - the relief they receive in such eventuality is their right. Farmers under crop insurance are assured of maintaining a decent standard of living not by charity but by their own efforts".

In fine, crop insurance is a device by which the losses sustained by a few are shared by all in a community of cultivators exposed to the same risk. An agriculturist pays a certain amount of premium every year and thus substitutes for an unpredictable loss occurring infrequently, a definitely known annual cost item in the farm management budget. The broad purpose of crop insurance therefore is to protect the individual farmer against the hazards of drought, floods, hail, fire, excessive rainfall, winds, plant diseases and insect pests. This protection helps to establish stability of agricultural income for the individual farmer as well the farming community as a whole."

PARLIAMENTARY QUESTIONS ON CROP INSURANCE IN THE
LOK SABHA DURING 1962 - 66 - A SUMMARY

- 7.8.1962 Q. Has crop insurance been introduced in any part of the country, even on an experimental basis?
- A. No. Punjab intends to have a pilot scheme. Details are being worked out.
- 20.11.1962 Q. What is the progress made so far in starting a crop insurance scheme?
- A. In accordance with the assurance given to Parliament in 1947, a scheme of crop insurance was formulated and circulated for adoption by states and the states found it difficult to implement because of financial stringency. Punjab however is planning a pilot scheme for the Third Plan period.
- 3.5.1963 Q. What is the progress of the proposal for a crop insurance scheme?
- A. Punjab has decided to have a pilot scheme. The details are being worked out. The final scheme has not yet been received by the Centre.
- 17.5.1963 Q. Is the government considering a proposal to introduce an insurance scheme for agricultural crops?
- A. Punjab is working out details of a pilot scheme. It is not possible to say at this stage when the scheme may be introduced.
- 25.2.1964 Q. Is a crop insurance scheme implemented in parts of India? Where and what are the main features?
- A. It is not introduced anywhere in India. The proposal is under consideration by Punjab.

- 28.4.1964 Q. Is there any proposal to introduce crop insurance scheme in some of the states? What are its main features?
- A. It is under consideration. The decision will be announced shortly.
- 15.9.1964 Q. Is there a proposal to introduce a crop insurance scheme in some parts of India?
- A. This requires central legislation. The scope and precise contents are now under consideration.
- 24.11.1964 Q. Is there a proposal to introduce a crop insurance scheme? What are the main features?
- A. Legislation under consideration. Implications are being looked into.
- 16.11.1965 Q. Has the National Crop Insurance scheme been finalised? What are the essential features?
- A. The Central Govt. has only decided to undertake legislation to enable desiring states to introduce the scheme. The draft bill has been submitted to the Cabinet.
- 15.2.1966 Q. Has the State Crop Insurance scheme been finalised? What are the details? Why is this delay?
- A. The Central Govt. has only decided to legislate.
- 10.5.1966 Q. What are the main features of the proposed legislation on Crop Insurance? When is it likely to be presented to Parliament?
- A. Before the end of 1966.

IN THE RAJYA SABHA DURING 1962-66

- 19.4.1962 Q. We learn that a crop insurance scheme is being started in Punjab from 1962-63 with Centre's approval. What are the main features?
- A. The final scheme has not been sent by Punjab to Centre.
- 6.9.1962 Q. Since when is a crop insurance scheme under consideration? When is it likely to be completed?
- A. Since 1947 it is under consideration. A pilot scheme was formulated in pursuance of an OSD's recommendations and circulated to States for adoption. No state could do so far. Punjab proposes to have a pilot scheme in 1963-64. Continuation or adoption by others will depend on results in Punjab.
- 9.12.1963 Q. Is government considering a scheme to cover losses suffered by farmers due to floods and droughts?
- A. A proposal to enact legislation for crop insurance is under consideration.
- 1.6.1964 Q. When is the legislation on crop insurance to be introduced?
- A. The proposal is still under consideration.
- 7.9.1964 Q. What is the progress of the efforts to introduce a Crop Insurance Scheme?
- A. This requires special legislation. The scope and precise contents of the legislation are under consideration. A decision will be announced early.

- 8.3.1965 Q. Is there a proposal to start a crop insurance scheme in the near future?
- A. A proposal to introduce a crop insurance scheme is under consideration.
- 20.9.1965 Q. Has the government completed its consideration of the crop insurance scheme? What is the decision?
- A. A pilot scheme has been prepared. Only Punjab will introduce on an experimental basis in selected CD blocks. The implementation is pending legislation by the Centre. A legislation is under consideration by the Government.
- 8.11.1965 Q. Has government decided to introduce a crop insurance scheme? When will it come into operation? What are the brief details?
- A. Government has decided to legislate thereby enabling states to go ahead and implement. The details are being worked out.